THE Journal

MARCH

1953

CONTENTS

Isomorphous substitution in enamel apatite—Posner 257
Pulp reaction to acrylic resin fillings—Grossman 265
Filling root canals with silver wires—Auerbach 270
Effects of instruments on enamel walls—Street 274
Dentifrice containing carbamide and urease—Hawes 280
Untested alternatives to fluoridation—Pearlman 287
Stannous fluoride versus sodium fluoride—Muhler 290
The first one hundred thousand dollars—Brauer 295
Evaluation of the Airdent unit—Morrison 298
Mandibular function after condylectomy—Smith 304
Cases and comments 322
Reports of councils 324
Editorials 336
First-aid for dentists—Bunting 339
Washington news letter 341
News of dentistry 343
The reader comments 362
Book reviews 364
Deaths 368
Announcements 372

Presenting two new prosthetic aids of major importance in your full and partial denture practice

THE TRUBYTE Bioform® MOULD GUIDE

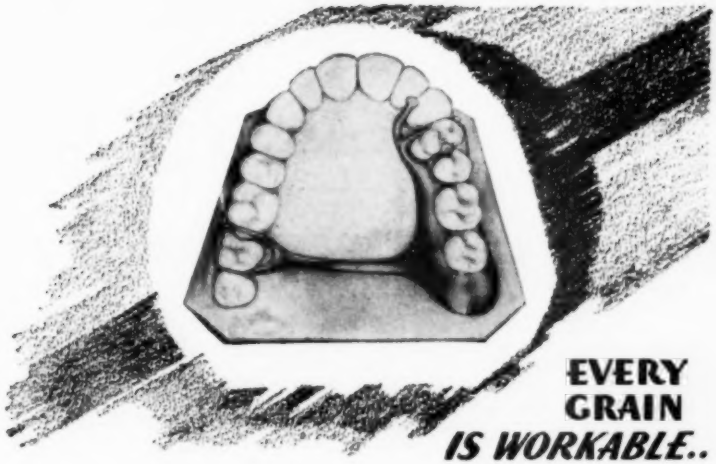
You'll want this new Trubyte Bioform Mould Guide for a number of reasons – but mostly for the great convenience it provides to the busy practitioner. It will enable you to quickly and accurately select teeth for your full and partial dentures. It will save you time and money in resets and remakes. Here in one attractive case are all the available upper and lower anterior moulds of Trubyte Bioform Teeth, with complete information on dimensions and articulations.

THE TRUBYTE Bioform® SHADE SELECTOR ASSORTMENT

Here is the easy and practical way to select shades for full and partial dentures. It practically eliminates the resets, remakes and disappointments that often follow selection with a single shade guide tooth. Why not try this practical prosthetic aid today. It contains 1 x 6 of the twelve shades of the Trubyte Bioform Natural Tooth Color System – the only fully correlated system which offers a full range of selection for all ages and complexions.

THE DENTISTS' SUPPLY COMPANY OF NEW YORK

220 West 42nd Street, New York 36, N. Y.



EVERY GRAIN *IS WORKABLE..*

DEE GOLD

The patient with a gold partial is assured of service in any emergency because gold is workable in the hands of the dentist and the technician. There is no need for special equipment.

This point alone affords service at all times and under all conditions—one of the many reasons why gold continues to be increasingly popular.

HANDY & HARMAN
DEE PRODUCTS GENERAL OFFICES & PLANT
1900 WEST KINZIE STREET · CHICAGO 22, ILL.
TORONTO 2B, ONTARIO, 141 JOHN ST. • LOS ANGELES 63, CALIF., 3625 MEDFORD ST.

The Journal of the American Dental Association, Vol. 46, No. 3. Published by the American Dental Association, 222 E. Superior St., Chicago 11, Ill. Yearly subscription $7.00 for U. S. and possessions; $8.00 for foreign countries. Single copy seventy-five cents. Entered as second-class matter, December 31, 1947, at the postoffice at Chicago, Ill., under the act of March 3, 1879. Published monthly. Copyright 1953 by the American Dental Association. The Journal of the American Dental Association is indexed in the Index to Dental Literature, in the Current List of Medical Literature and, in part, in the quarterly Cumulative Index Medicus, Biological Abstracts and Chemical Abstracts.

for the best in

S.S.WHITE Diamond INSTRUMENTS

Specify straight handpiece or angle mandrels when ordering

★

ASSORTMENT No. 5

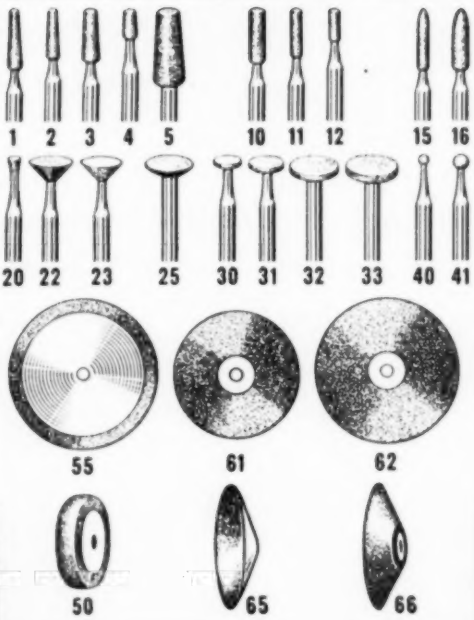
4 Mounted for angles, Nos. 3, 10, 20, 31
1 Unmounted No. 62
plus 1 instrument as selected
With plastic holder

Price.....**$16.50**

Single Instruments, each.....$3.50
5 or more, each..... 3.00

Unmounted instruments are supplied with one No. 303 Handpiece mandrel and one No. 303 Angle mandrel, each ... $5.00
5 or more, each 4.50

Prices subject to change



When you buy 5 ------ you get 6

One instrument without charge with every 5 purchased

Buy from your local dealer

cavity preparation

S.S.WHITE Carbide BURS

FOR HANDPIECE AND LATCH TYPE ANGLES

Round	Inverted Cone	Flat End Fissure	Flat End Fissure	Tapered Fissure
2 4 6 8	35 37 39	59	558 559	701 702 703
Each $1.40	$1.40	$1.40	$2.00	$2.00
6 to 11, each 1.26	1.26	1.26	1.80	1.80
12 or more, each 1.19	1.19	1.19	1.70	1.70

FOR TAPER SHANK ANGLES

2 4 6 8	35 37 39	59	558 559	701 702 703
Each $1.50	$1.50	$1.50	$2.10	$2.10
6 to 11, each 1.35	1.35	1.35	1.89	1.89
12 or more, each 1.275	1.275	1.275	1.785	1.785

Also sold in assortments consisting of 1 each Carbide Burs Nos. 2, 4, 35, 37, 559, and 702, in Plastic Holder

ASSORTMENT No. 2, for latch-type Angles ..... $ 8.60
ASSORTMENT No. 2TS, for taper-shank Angles 9.18
ASSORTMENT No. 3, (8 plain: 4 dentate)
3 handpiece, 9 latch-type Burs 16.30

THE S.S.WHITE DENTAL MFG. CO., Philadelphia 5, Pa.

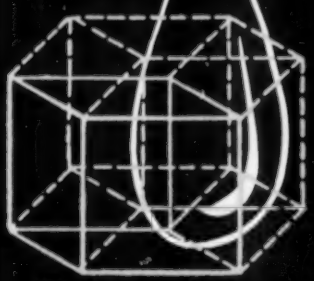
local anesthesia... 4th dimensional

with

XYLOCAINE® HYDROCHLORIDE

ASTRA

(Brand of lidocaine hydrochloride*)



"The Tesseract, or Tetra-Hyper-cube: a 4-space figure generated by the movement of a cube in the direction (to us unimaginable) of the 4th dimension * * *"†

† Bragdon, C.: *A Primer of Higher Space, New York, Alfred A. Knopf, 1923, Pate 1.*

QUICK-ACTING
POTENT
WELL-TOLERATED
HIGHLY-STABLE

SUPPLIED

Stocked by leading dental supply dealers as a 2% solution, without epinephrine and with epinephrine 1:100,000 or 1:50,000; dispensed in 1.8cc cartridges, packed 50 cartridges to a vacuum-sealed tin. Also available in 20cc multiple dose vials packed 5 vials to a carton.

Latitude and longitude (spread) and depth might adequately define ordinary local anesthesia. The fourth dimension, or time, is essential to preferred local anesthesia, specially as related to the waiting period between injection and onset of anesthesia. With Xylocaine Hydrochloride (Astra), anesthesia is so rapid in onset,* that minutes of "waiting time" are routinely converted to hours of "working time".

* "It was his opinion (the Dean of the Dental College at Stockholm) that this rapidity of onset saved each dentist who saw between 12 and 40 patients per day, one hour of waiting time" . . .
Hingson, R.A., N.Y. J. Dent., 30:370 (Oct.) 1950.

Literature and Samples Sent on Request

ASTRA PHARMACEUTICAL PRODUCTS, INC.
WORCESTER, MASS. U.S.A.

*U.S. Pat. No. 2,441,498

XYLOCAINE®

(Brand of lidocaine*)

OINTMENT

ASTRA

QUICK-ACTING — PROFOUND
NON-IRRITATING

An effective topical anesthetic for use in the oral cavity. Circumvents patient apprehension prior to injection. Minimizes discomfort during normally painful deep scaling procedures. Useful wherever freedom from pain is an essential prerequisite to complete patient cooperation.

Write For Professional Sample and Descriptive Literature.

Stocked by leading dental supply houses in 35 gram wide-mouth glass jars.

U.S. Patent No. 2,441,498

ASTRA PHARMACEUTICAL PRODUCTS, INC.
WORCESTER, MASS. U.S.A.

Send for NEW book—FACTS "Your Teeth are NEVER Clean Until Cleaned BETWEEN"

Natural bite guides floss safely. No. 1, 50c. No. 2, in Compact, $1.00. Refills, 25c. 5 for $1.00, y mail only. Send dollar bil for sampe asst. Liberal discount, dozen lots—gifts.

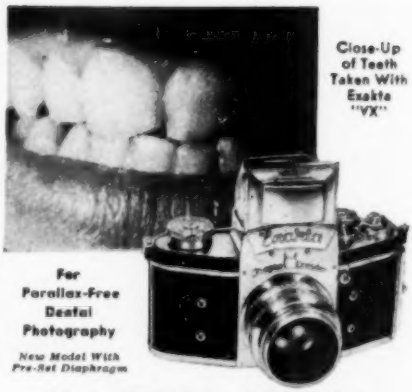
Cleans the 30 spaces—"60" contacting surfaces between teeth—NEVER cleaned by brushing. Food particle ferment and will decay in the spaces.

Finest — Silent Modern — All inclosed — No Mercury Spill No. 1 $50 — No. 2 $60 — Variable speed. Turn in old mixers. Allowance $15 to $25. Use No. 2 Rim-Cut Capsule. CUTS

3 for $2

No Balls

Flossy Dental Co., 228 So. Wabash, Chicago 4, Ill



Close-Up of Teeth Taken With Exakta "VX"

For Parallax-Free Dental Photography

New Model With Pre-Set Diaphragm

35mm EXAKTA—MODEL VX

Single Lens Reflex Camera

For photographing conditions before and after treatment, cavities, inlays and bridgework, and for recording and for demonstrating oral treatment to patients. The indispensable aid of the progressive dentist! With f2.8 Zeiss Tessar "T" Coated Lens with,

Pre-Set Diaphragm Control	$269.50
Penta Prism Eye Level Reflex Viewhader	**50.00**
Extension Tube Set	**24.00**
Microscope Adapter	**29.50**

FREE—Write Dept. 300 For Free Descriptive Booklet "C" on Camera & Accessories and Brochure On Close-Up Technique With Exakta.

EXAKTA CAMERA COMPANY
46 W. 29th St., New York 1, N. Y.

Exclusive Sales and Service Organization In U. S. A. For Ihagee Camera Works, Germany

FREE TO DENTISTS

Every Dentist . . .

Write for these educational treatises and information on Burton Diagnostic Instruments. Sent absolutely FREE on request.

Send for yours today!

BURTON MANUFACTURING COMPANY
11201 W. Pico Blvd., Los Angeles 64, Calif.

The formal, nation-wide announcement to the dental profession of Warren Laboratories' new patented BICAST Partial will appear in the next issue of this publication. We are sure it will excite great interest in everyone in the profession.

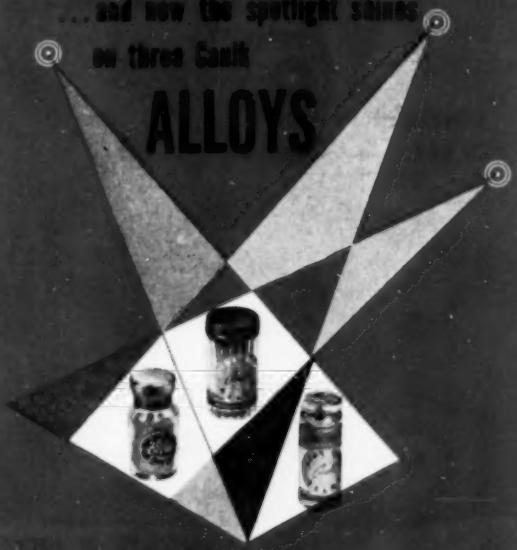
BICAST

U. S. PAT. NO. 2,611,956

WARREN LABORATORIES, BALTIMORE 1, MD.

...and now the spotlight shines on three Caulk

ALLOYS



With the introduction of the new Caulk NON-ZINC ALLOY, Caulk now offers three alloys to provide the widest possible range of manipulative requirements. And each alloy is manufactured to release more mercury more easily from the filling.

20th CENTURY. For 3 generations the Number 1 choice with a vast number of dentists because of its dependable strength, positive amalgamation, and exceptional uniformity of behavior.

FINE CUT. Has won the approval of the many dentists who prefer a fine-grained alloy with more positive setting characteristics.

NON-ZINC ALLOY. The new Caulk NON-ZINC formula has a silver content of 72% for extra strength. Ultrasmooth mixes for ideal adaptation. Rapid amalgamation. Wide technic range. Specially adapted to work involving gingival cavities where (as with children) maintaining dryness is a problem.

For modern materials call on caulk Milford, Delaware

Diagnosing the packet

EXCLUSIVE "PULL-A-TAB" PACKET. SAVES DARKROOM TIME. PREVENTS ERRORS.

HEAT-SEALED PACKET... NO GLUE... NOTHING STICKY.

CONVENIENTLY PACKED IN BOXES OF 24 AND 144.

ROUNDED CORNERS ASSURE PATIENT COMFORT.

SALIVA-PROOF PACKET PROTECTS FILM.

FILM TYPE CLEARLY EMBOSSED ON TAB.

EASILY OPENED BY PULLING TAB. NO BROKEN FINGERNAILS.

GREEN TAB IDENTIFIES TONGUE SIDE OF PACKET.

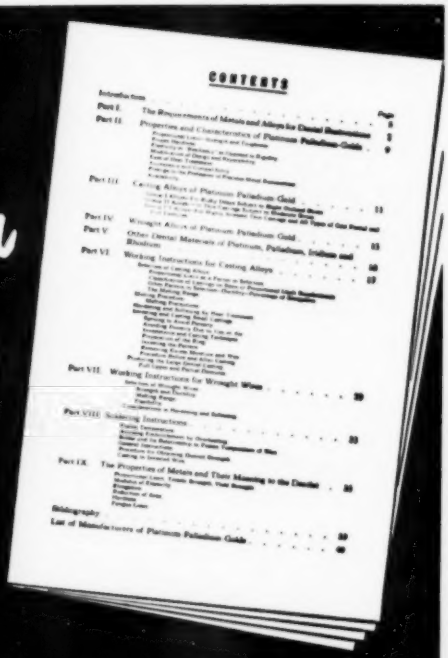
Du Pont Dental X-ray Film is available in both Periapical and Bitewing types. Speed of the film allows as much as 30 per cent reduction in developing time. Blue base of film aids in making quick, accurate diagnosis of every radiograph. Ask your dealer for Du Pont Dental X-ray Film by name. E. I. du Pont de Nemours & Co. (Inc.), Photo Products Department, Wilmington 98, Delaware. *In Canada: Canadian Industries, Ltd., Montreal.*

DU PONT
DENTAL X-RAY FILM

DUPONT

BETTER THINGS FOR BETTER LIVING
... THROUGH CHEMISTRY

Reference Information on Precious Metals in Dentistry



"Platinum–Palladium–Gold in Dentistry," was compiled in order to classify and simplify the extensive information on precious metals as an aid to dentists and technicians.

Here's what it contains–

- It describes the characteristics of the alloys and their suitability for different types of prosthetic dentistry and orthodontia.
- It gives instructions for investing, casting, soldering, softening, hardening, and otherwise working cast and wrought alloys.
- It defines and analyzes the significance of the strength properties quoted by dental gold manufacturers.

All in all, you'll find this forty-page book a clearly written, valuable and informative reference.

Use the handy coupon to order your free copy now.

Platinum Metals Division
The International Nickel Company, Inc.
67 Wall Street, New York 5, N. Y.

Please send me my free copy of "Platinum-Palladium-Gold in Dentistry."

*Name*_____

*Street*_____

*City*_____

*State*_____

Platinum Metals Division

THE INTERNATIONAL NICKEL COMPANY, INC., 67 Wall Street, New York 5, N. Y.

ACCIDENT • HOSPITAL • SICKNESS

INSURANCE

For Physicians, Surgeons, Dentists Exclusively

ALL PREMIUMS COME FROM — DENTISTS SURGEONS PHYSICIANS — ALL BENEFITS GO TO

$5,000 accidental death — Quarterly $8.00
$25 weekly indemnity, accident and sickness

$10,000 accidental death — Quarterly $16.00
$50 weekly indemnity, accident and sickness

$15,000 accidental death — Quarterly $24.00
$75 weekly indemnity, accident and sickness

$20,000 accidental death — Quarterly $32.00
$100 weekly indemnity, accident and sickness

COST HAS NEVER EXCEEDED AMOUNTS SHOWN

ALSO HOSPITAL INSURANCE

	Single	Double	Triple	Quadruple
60 days in Hospital	5.00 per day	10.00 per day	15.00 per day	20.00 per day
10 days of Nurse at Home	5.00 per day	10.00 per day	15.00 per day	20.00 per day
Laboratory Fees in Hospital	5.00	10.00	15.00	20.00
Operating Room in Hospital	10.00	20.00	30.00	40.00
Anesthetic in Hospital	10.00	20.00	30.00	40.00
X-Ray in Hospital	10.00	20.00	30.00	40.00
Medicines in Hospital	10.00	20.00	30.00	40.00
Ambulance to or from Hospital	10.00	20.00	30.00	40.00
COSTS (Quarterly)				
Adult	2.50	5.00	7.50	10.00
Child to age 19	1.50	3.00	4.50	6.00
Child over 19	2.50	5.00	7.50	10.00

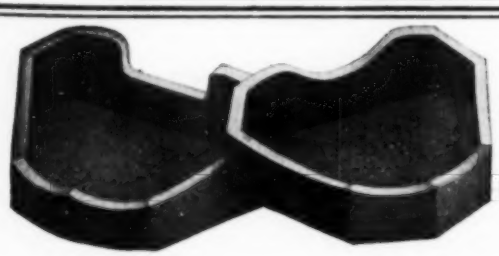
$4,000,000.00 INVESTED ASSETS

PHYSICIANS CASUALTY ASSOCIATION
PHYSICIANS HEALTH ASSOCIATION
51 years under the same management

$19,500,000.00 PAID FOR CLAIMS

400 First National Bank Building — **Omaha 2, Nebraska**

$200,000.00 deposited with State of Nebraska for protection of our members



By Popular Demand

JUMBO-SIZED COLUMBIA RUBBER MODEL FORMERS

Make Neat Bases on Study and Work Models

per Set—1 Upper and 1 Lower
No. R1X—Jumbo-Size . . . $4.00

Other Sizes Available
No. R1—Large 3.50
No. R2—Medium 3.50
No. R3—Small 3.00

These Extra Large Model Formers speed up making symmetrical bases for study and work models of extra large impressions. They eliminate boxing-up, fussing and trimming. Just the thing for models of alginate impressions, which can run notoriously large. Base comes out of the flexible rubber former smooth, symmetrical, and perfectly finished. Full instructions with every set.

If you do not have our Catalog No. 33, write for your copy today.

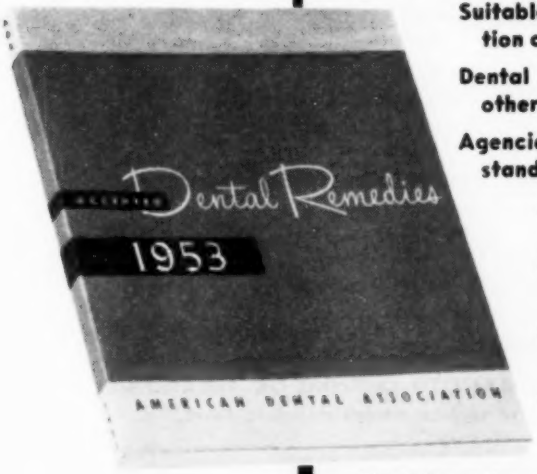
COLUMBIA DENTOFORM CORPORATION

"The House of A Thousand Models"—also Headquarters for Brown Precision Attachments

131 EAST 23rd STREET — NEW YORK 10, N. Y.

THE 18TH EDITION . . .

ACCEPTED Dental Remedies



DO YOU KNOW:

Suitable conditions for disinfection of instruments?

Dental status of antibiotics and other anti-infectives?

Agencies responsible for drug standards?

Accepted commercial products?

Mechanics of prescription writing?

References to products not included in A.D.R.?

Provisions for acceptance of products?

This information appears in ACCEPTED DENTAL REMEDIES

Available NOW at Only $2.00

ORDER DEPARTMENT, AMERICAN DENTAL ASSOCIATION
222 E. Superior St., Chicago 11, Illinois

Check the order you wish to place:

..... Place my name on the standing order list to get ACCEPTED DENTAL REMEDIES regularly each year beginning with the 1953 edition.

..... Just send me a copy of the 1953 book. ..... My check for $2.00 is enclosed.

Signed .....

Address .....

..... City Zone State

FOR MODELS . . FOR DIES:

- ***GREATER PRECISION . .***
  ONLY HALF AS MUCH EXPANSION (SETTING DISTORTION) as the most accurate of previous stones.
- ***GREATER STRENGTH . .***
  NEARLY FIFTY PER CENT HIGHER CRUSHING STRENGTH than the strongest of conventional stones.
- ***GREATER SURFACE HARDNESS . .***
  VASTLY MORE RESISTANT TO CHIPPING OR ABRASION; its ultra-smooth, dense surface retains minutest detail.

Duroc ideally fulfills the demand for a precision die material of extreme hardness for use in conjunction with the elastic impression materials in the indirect technic for inlay and bridge work.

Available in 5-, 15-, 35-, 50- and 100-pound containers.

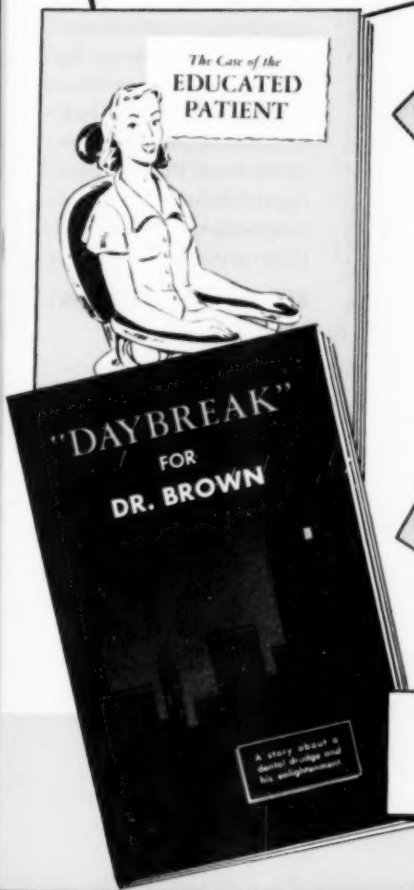
ORDER A CAN FOR TRIAL NOW!

THE RANSOM & RANDOLPH COMPANY
TOLEDO 1, OHIO

Whether your practice is...

←OR→

GET your CHOICE of these FREE booklets!



GET YOUR CHOICE of *either* of two FREE booklets. Select that which most closely resembles the condition of your practice.

No. 1 (upper left) tells how one unhappy dentist just couldn't develop his practice... how he lost and regained enthusiasm for his work. His income was below the national average.

No. 2 (lower left) is a story about a very successful dentist. (He thought!) But he was a dental drudge. Read about his enlightenment. Though his income was high, he was unhappy.

Both dentists were in trouble due to poor management, so be sure to select the story that most closely resembles your conditions.

The booklets are distributed by Professional Budget Plan — specialists in dental practice management since 1935. Remember, PBP can help you whether your problem is the need for more income, better appointment organization, better collections, more efficient personnel, etc. Learn how by reading the booklet you select.

MAIL COUPON TODAY

PROFESSIONAL BUDGET PLAN
303 E. Wilson Street, Madison, Wis.

YES, send the FREE booklet checked below. (no obligation)

☐ The Case of the Educated Patient
☐ "Daybreak" for Dr. Brown.

Dr. .....

Address .....

City ..... Zone ..... State .....

Johnnie's willingness to "take a chance" will lead to embarrassing consequences, because he's not careful.

Novice denture wearers, too, usually find it expedient to take every possible precaution to avoid painfully embarrassing accidents. They appreciate the suggestion of Wernet's Powder during the difficult period of adaptation, to strengthen their self-confidence by

WERNET DENTAL MFG. CO., Inc.

Wernet's Powder

hands!"

providing an extra measure of reassurance.

Wernet's Powder hastens the achievement of manipulative skill, by its improvement of stability and retention. It helps reduce initial discomforts, too, by its soft, resilient cushion. Particularly when the adjustment problem is aggravated by anatomical handicaps or psychological difficulties, it encourages patience and perseverance.

JERSEY CITY 2, NEW JERSEY

WERNET DENTAL LORE

MARCH 1953

Even dentists find their place in the romantic drama of history. It was Thomas W. Evans (1823-97) — the founder of Pennsylvania's Evans Institute, and dentist to Napoleon III — who brought about the escape of Empress Eugenie from Paris at the time of the fall of the Third Empire!

• • •

A salute to the dental profession: During World War II, approximately 22,000 dentists (nearly one-third of all practicing dentists in the U.S.) served in the armed forces . . . a record unexcelled by any other vocational group.

• • •

Ever do business with a "resurrectionist"? You might have, if this were still the eighteenth century, when dentists had to rely on grave-robbers, who operated most profitably under this designation in supplying human teeth for prosthetic work.

• • •

Dental school requirements in "the good old days" would gladden the modern student's heart. For entrance to the Baltimore College of Dental Surgery in 1840, all that was necessary was to pass an ordinary English test; while the Harvard Dental School in 1868 settled for a written English composition and a "competent" knowledge of physics.

• • •

To be a good pedodontist, a dentist apparently has to be as much a good lecturer as he is a patient operator. According to a recent survey, 75% of such specialists follow a definite program of education on how to brush the teeth, how often to visit the dentist, what diets to follow, general facts on dentition, and advice on individual dental problems — with 80% of this instruction being directed at the children's parents.

• • •

Wernet's Powder is truly "good enough to eat" . . . indeed, the Karaya gum powder forming its base is widely used in the field of food processing, in such products as French dressings, ice pops and sherbets, cheese spreads, meringue products and other delicacies.

Speeds the Mastery of the Denture

FREE PROFESSIONAL SAMPLES

WERNET DENTAL MFG. CO., INC., Jersey City 2, N. J.

Please send me professional samples of Wernet's Powder.

11-C

Dr._____
PLEASE PRINT

Address_____

City_____ Zone____ State_____

FIT—for a King!

Ticonium is cast to fit!

Put away those pliers! You won't have to plier-fit your Ticonium cases. They're "fit" for a king!

You'll thrill at the "go-into-place" accuracy of Ticonium. It's no guess-work. Every step in the Ticonium technique is planned to give you precision inlay-accuracy. **Try TICONIUM!**

For cases that FIT . . . specify TICONIUM
413 N. Pearl Street, Albany, N. Y.

Ticonium cases

F *ine grain*
I *nlay accuracy*
T *i-lectro polished*

MARCH 1953 VOLUME 46 • NUMBER 3

OF THE AMERICAN DENTAL ASSOCIATION

Isomorphous substitution in enamel apatite

Aaron S. Posner, M.S., Washington, D. C., and Samuel R. Stephenson,† B.S., Birmingham, Ala.*

Human tooth enamel is found by chemical analysis to be about 95 per cent inorganic. Understanding of dental enamel requires a knowledge of the structure of the mineral-like portion of this tissue. The inorganic material in enamel is essentially a calcium phosphate containing about 3 per cent carbonate ions. The molar ratio of calcium to phosphorus has been found to range from 1.57[1] to 1.66[2] per cent, the carbonate content from 2 to 4 per cent. This chemical variance does not result in any appreciable change in the roentgen-ray diffraction data, the pattern being essentially hydroxyapatite in all cases. In order to understand how it is possible to vary a substance chemically without varying a fundamental crystallographic property such as its roentgen-ray pattern, it is necessary to examine more closely the crystal chemistry of the apatite series. Before doing this, it is well to review briefly the basic theory of roentgen-ray diffraction.

THEORY OF ROENTGEN-RAY DIFFRACTION

A crystal is a regular, three-dimensional assemblage of some fundamental repeat unit. In the case of hydroxyapatite this repeat unit is $Ca_{10}(PO_4)_6(OH)_2$, which is contained in a parallelepiped known as the unit cell, shown in Figure 1, left, in a stylized fashion. This unit translates itself through space in three directions, forming a massive crystal in much the same way as bricks form a wall. The axes, or cell edges, of the unit cell can be calculated from the roentgen-ray diffraction

Presented before the Section on Research, ninety-third annual session of the American Dental Association, St. Louis, September 9, 1952.

*Research associate, American Dental Association Research Fellowship at the National Bureau of Standards.

†Department of chemistry, University of Alabama.

1. Armstrong, W. D., and Brekhus, P. J. Chemical constitution of enamel and dentin: principal components, J. Biol. Chem. 120:677, Sept., 1937.

2. Murray, M. M., and Bowes, J. H. Composition of enamel, dentin and root in caries and pyorrhea. Brit. D. J. 61:473, Oct. 15, 1936.

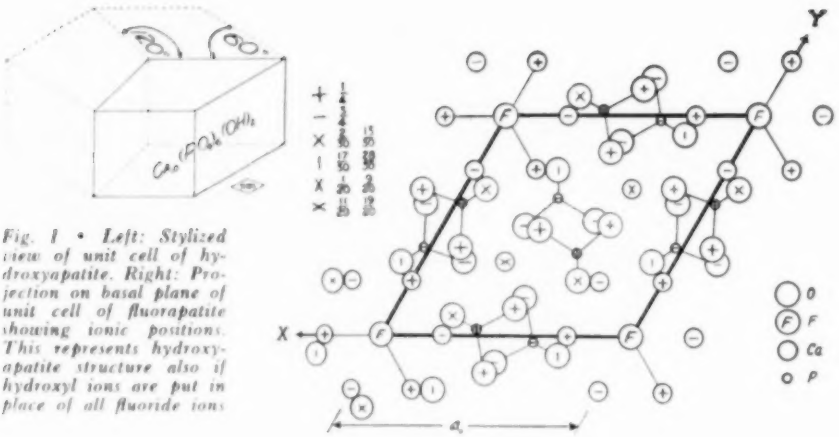


Fig. 1 • Left: Stylized view of unit cell of hydroxyapatite. Right: Projection on basal plane of unit cell of fluorapatite showing ionic positions. This represents hydroxyapatite structure also if hydroxyl ions are put in place of all fluoride ions

data; and these values then become a means of identifying the compound in question. A more detailed view of the unit cell of apatite can be seen in Figure 1, right.

When monochromatic roentgen rays are passed through apatite, each ion of the structure scatters roentgen rays in a pattern dependent on the electron cloud of that ion. The fact that the various ions are periodically spaced in a three-dimensional arrangement, the spacing being of the order of magnitude of the wave length of roentgen rays, enables the scattering from the various ions to interact and to cause constructive and destructive interference at certain critical angles, resulting in roentgen-ray maxima and minima respectively. The ionic spacing and arrangement are quantitatively related to the angles and intensities of the roentgen-ray diffraction maxima. Figure 2 shows roentgen-ray diffraction diagrams of powdered human enamel and powdered hydroxyapatite.

ISOMORPHOUS SUBSTITUTION

Klement[3] found that the mineral pyromorphite, a phosphate which contains bivalent lead but no calcium, gave a roentgen-ray pattern characteristic of hydroxyapatite. As calcium ions and bivalent lead ions have the same valence and are of the same order of size,[4] it is not surprising to find a hydroxyapatite in which all the calcium is supplanted by lead ions. As the lead ion is slightly larger than the calcium ion, the unit cell of pyromorphite measured from the roentgen-ray diagram shows a corresponding increase in volume, approximately 5 per cent. This replacement of one ion for another in a structure is called isomorphous substitution. In general, one ion can substitute for another when it is very similar in its chemical properties and similar enough in size so that the structure symmetry is not disrupted. Such substitution is not always complete as in the case of pyromorphite; often there is only a partial replacement of one ion by another. The amount of an ion which can be supplanted by one or more ions is

3. Klement, R. Basische Phosphat zweiwertiger Metalle. II. Blei-hydroxylapatit. Zeit. anorg. Chem. 237, 161, 1938.

4. Pauling, L. The sizes of ions and the structure of the ionic crystals. J. Am. Chem. Soc. 49:765, 1927.

determined by the physical and chemical conditions of the substitution as well as by the relative stability of the various intermediate compounds.

SUBSTITUTION IN APATITE

There is no doubt that ions such as magnesium, potassium and sodium can proxy for the calcium positions in the structure of hydroxyapatite.[5] Some investigators believe that at least 6 per cent of the positions normally occupied by calcium in apatite are occupied by magnesium, potassium and sodium in enamel apatite.[6] In the case of bone apatite, however, Logan and Taylor[7] have presented evidence that these ions are adsorbed on readily available surfaces rather than substituted in the apatite structure. They found that sodium and magnesium ions are preferentially dissolved by acid disproportionately to their stoichiometric ratios in the solid substance.

The problem of fluoride ions entering the structure of enamel apatite is of importance to the clinician as well as the research worker. Whether or not the fluoride ions actually enter into the structure or lodge on the surfaces of the tiny enamel apatite crystals is not yet understood. The structure of a completely fluoride-substituted apatite, fluorapatite, as it is called, was worked out in detail by Mehmel[8] and St. Naray-Szabo[9] (Fig. 1, right). They demonstrated that fluorapatite has the same structure as hydroxyapatite with the fluoride ions substituting for all the hydroxyl ions. The unit cell size of fluorapatite is slightly smaller than that of hydroxyapatite; and this fact, coupled with chemical analysis, has been used to identify fluorapatite. Perdok[10]

5. McConnell, D. The nature of rock phosphates, teeth, and bones. J. Washington Acad. Sc. 42:36, 1952.

6. Logan, M. A., and Taylor, H. L. Solubility of bone salt; partial solution of bone and carbonate-containing calcium phosphate precipitates. J. Biol. Chem. 125:391, Sept., 1938.

7. Logan, M. A., and Taylor, H. L. Solubility of bone salt; factors affecting its formation. J. Biol. Chem. 125:377, Sept., 1938.

8. Mehmel, M. Über die Struktur des Apatits. Zeit. f. Krist. 75:323, 1930.

9. St. Naray-Szabo, S. The structure of apatite. Zeit. f. Krist. 75:387, 1930.

10. Perdok, W. Die Aufnahme von Fluorionen durch Zahnschmelz. Schweiz. Monatschr. f. Zahnheilkunde und Zahntechnik 62:269, 1952.

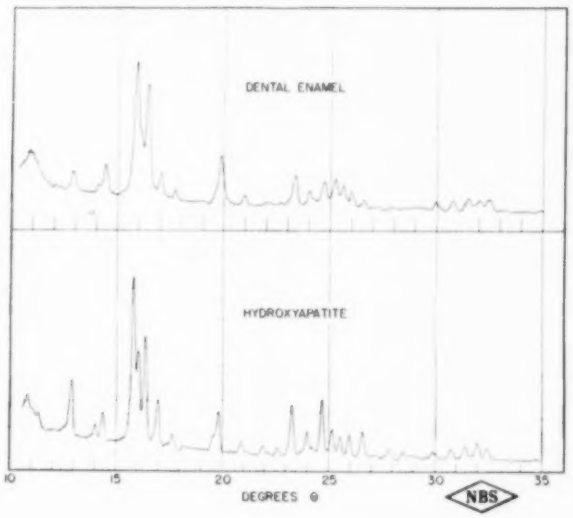


Fig. 2 • Roentgen-ray diffraction diagrams of powdered human enamel and powdered hydroxyapatite. Enamel has been treated in a hydrothermal bomb at 300° C., 2,000 p.s.i., for two days to sharpen originally broad maxima

found no evidence of the presence of fluorapatite in dental enamel which contained fluoride ions after treatment with potassium fluoride. Trautz,[11] on the other hand, found some shark's teeth which analyzed as fluorapatite and gave the characteristic fluorapatite roentgen-ray pattern. It remains to be proved whether or not the fluoride can definitely enter the structure of human enamel apatite and form fluorapatite.

There is evidence against isomorphous replacement of hydroxyl by fluoride ions when the fluoride solution is topically applied to the enamel. Gerould[12] and later Scott, Picard and Wyckoff[13] demonstrated that calcium fluoride was deposited on the enamel surface on topical application of sodium fluoride. It was shown that the electron diffraction pattern of the surface of the enamel changed from an apatite pattern to a calcium fluoride pattern. The use of electron diffraction technics as opposed to roentgen-ray diffraction was most expedient, since the electron beam does not penetrate the enamel more than about 100 A. Thus, this surface phenomenon is not lost in the bulk diffraction by the rest of the enamel apatite.

There are experiments in which fluoride neither enters the structure of enamel apatite nor deposits on the surface as calcium fluoride. Volker and his coworkers[14] showed that powdered enamel adsorbs fluoride ions very much as charcoal adsorbs gases. There is a great deal of interest in the ability of enamel apatite to adsorb various ions from solution, and many workers are investigating this phenomenon.

CARBONATE IN APATITE

Another controversial subject is the carbonate content of enamel. Here, too, the argument hinges on the existence of an ion as an integral part of the apatite structure or as an admixed or adsorbed material. The advocates of the theory of isomorphous substitution of carbonate in enamel apatite have attempted to prove their assumption by showing evidence of carbonate substitution in the structure of francolite, a carbonate-containing fluorapatite. Proof by analogy is attempted on account of the difficulty of obtaining sharp roentgen-ray diffraction patterns from tooth mineral because of the fineness of the enamel apatite crystals. McConnell[15] compared francolite with fluorapatite and showed minor differences in their roentgen-ray patterns. He pointed out also that francolite has a higher optical birefringence than fluorapatite and in a paper with Gruner[16] demonstrated that the mean index of refraction of francolite is less than that of fluorapatite. In addition he suggested[15] a substitution mechanism for carbonate in francolite based on the powder roentgen-ray data and a series of careful chemical analyses.

To make an accurate study of the roentgen-ray diffraction diagrams and the index of refraction of enamel apatite, it is necessary to have crystals of at least 10,000 A. in diameter. Since the crystals of enamel apatite are very small, about 500 A., it is necessary to grow them larger to study them crystallographically. This increase in size was accomplished in our laboratory by treating the material in a hydrothermal bomb according to the method of Morey and Ingerson.[17] A

11. Trautz, O. R. Private communication.

12. Gerould, C. H. Electron microscope study of the mechanism of fluorine deposition in teeth. J. D. Res. 24:223, Oct., 1945.

13. Scott, D. B.; Picard, R. G., and Wyckoff, R. W. G. Studies of the action of sodium fluoride on human enamel by electron microscopy and electron diffraction. Pub. Health Rep. 65:43, Jan. 13, 1950.

14. Volker, J. F., and others. Adsorption of fluorides by enamel, dentin, bone, and hydroxyapatite as shown by radioactive isotopes. J. Biol. Chem. 134:543, July, 1940.

15. McConnell, D. The problems of the carbonate apatites. IV. Structural substitutions involving carbonate and hydroxyl ions. (In print.)

16. McConnell, D., and Gruner, J. W. The problem of the carbonate-apatites. III. Carbonate-apatite from Magnet Cove, Arkansas. Am. Mineral. 25:157, 1940.

17. Morey, G. W., and Ingerson, E. Bomb for use in hydrothermal experimentation. Am. Mineral. 22:1121, 1937.

charge was placed in water in a platinum-lined, sealed autoclave or bomb. The system was heated to about 300 degrees C., so that there was an internal pressure of about 2,000 pounds per square inch. This treatment resulted in the growth of the apatite crystals from about 500 to 30,000 A. A chemical analysis of the enamel apatite crystals both before and after the bomb treatment, as well as a microanalysis of the bomb water, showed that there is no chemical change during the bomb treatment. With these enlarged crystals, it was possible to obtain better crystallographic data on enamel apatite.

When the improved roentgen-ray pattern of enamel apatite is compared with the pattern of hydroxyapatite (Fig. 2), there does not seem to be enough difference in the patterns to say that there is isomorphous substitution of the carbonate ion. The intensities and the positions of the maxima are very similar, and for all practical purposes the roentgen-ray patterns may be considered identical. At this writing there is no definite crystallographic proof of the presence of carbonate in the structure of enamel apatite or any other apatite mineral.

The presence of carbonate in the form of admixed calcium carbonate in dental enamel has not been detected with the electron microscope or by roentgen-ray diffraction methods. Silverman, Fuyat and Weiser[18] established the fact that one can detect by roentgen-ray diffraction powder methods as little as 3 per cent calcium carbonate admixed physically with fluorapatite. These investigators demonstrated also that it is possible to detect by differential thermal analysis 1.6 per cent calcium carbonate mixed with apatite and by differential solubility tests 0.1 per cent calcium carbonate when mixed with apatite. In the latter test the solvent used to differentiate between calcium carbonate and fluorapatite was 0.5 molar triammonium citrate, in which the former was almost 50 times more soluble than the latter. The conclusion was that if calcium carbonate were present in dental enamel as a separate phase, it would be possible to detect it by all three methods mentioned, since carbonate is present in sufficient amount.

The arguments for two phases in human enamel are just as numerous as those for isomorphous substitution. Preferential solution of carbonate by acid on samples of bone has been interpreted by Dallemagne[19] to be evidence for the presence of a separate carbonate phase. Logan and Taylor[7] have shown that it is possible to precipitate an apatite from a synthetic plasma solution. This precipitation takes place in the presence of carbonate, and the apatite on precipitation steadily withdraws carbonate ion from the solution. This action indicates the reversibility of "dissociating" carbonate from the apatites and lends weight to the idea that the carbonate in apatites exists as a separate phase.

Hendricks and Hill[20] believe that the carbonate in dental enamel is located on "entrapped" surfaces. They demonstrate the presence of such surfaces by showing that the surface area, as measured by low temperature nitrogen adsorption, goes up much beyond the expected value when enamel is ground finer and finer. The presence of a high surface area, coupled with the fact that there is a preferential solution of carbonate in enamel apatite, supports the theory that the carbonate is located on entrapped surfaces and not bound structurally. These workers make no definite statement as to whether the carbonate is present as calcium carbonate or as some other compound or ion.

18. Silverman, S. R.; Fuyat, R. K., and Weiser, J. D. Quantitative determination of calcite associated with carbonate-bearing apatites. Am. Mineral. 37:211, March-April, 1952.

19. Dallemagne, M. J., and Brasseur, H. Un cas d'interprétation difficile: la nature du sel principal de l'os étudiée par la diffraction des rayons x. Experientia 3:469, 1947.

20. Hendricks, S. B., and Hill, W. L. The nature of bone and phosphate rock. Proc. Nat. Acad. Sc. 36:731, Dec., 1950.

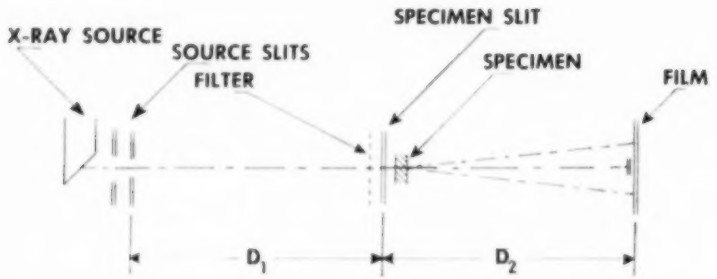


Fig. 3 • Small-angle scattering apparatus

EVIDENCE FOR TWO-PHASE SYSTEM

There has been a need for some positive crystallographic evidence for the occurrence of carbonate on entrapped surfaces. A more specific way of describing such a two-phase system is to say there is an electron density inhomogeneity in the enamel apatite. Thus particles of calcium carbonate, too small to be seen in the electron microscope, may be distributed throughout the apatite and result in a two-phase system, each phase having a different average electron density. There is a technic in roentgen-ray crystallography known as low-angle scattering which can be used to distinguish between two substances of different electron densities and to determine the particle size distribution of this system. This tool for evaluating the particle size in the range 10 A. to 1,000 A. has been used to determine the size and shape of such materials as carbon black, alumina gels, collagen fibers and many viruses. This method is not concerned with intensity maxima due to the arrangement of the ions in a structure but with the scattering of roentgen rays close to the center of the main, monochromatic beam as it passes through the sample. This scattering at small angles is directly related to the particle shape and size of the sample. Figure 3 shows a diagram of the apparatus used, and Figure 4 shows the results of a low-angle scattering experiment on an apatite mineral. The latter is a trace of intensity of scattering at various angles on either side of the main beam, the more intense scattering appearing closest to the main beam.

Guinier[21] has shown that there is a relationship between the intensity of scattering, the angle at which the scattering of the roentgen rays occurs, and the radius of the particles doing the scattering. According to Guinier, assuming the particles to be spherical,

$$I = MN^2 \exp\left[-\frac{(2\pi\varrho\varepsilon)^2}{5\lambda^2} \right]$$

where I = intensity of roentgen rays at angle ε,
M = number of particles,
N = number of electrons per particle,
λ = wave length of roentgen rays, and
ϱ = radius of the particles.

By taking the natural logarithm of both sides of this equation and converting to logarithms of the base 10, the following equation is obtained:

$$\log I = \log MN^2 - \left(\frac{4\pi^2\varrho^2}{11.5\lambda^2} \right) \varepsilon^2$$

21. Guinier, A. La diffraction des rayons x aux tres petits angles: application a l'etude de phenomenes ultramicroscopiques. Ann. de phys. 12:161, 1939.

This is an equation of the form $y = bmx$ and thus the equation of a straight line. If all the particles are equal and log I versus ϵ^2, or some function of ϵ^2, is plotted, a straight line is obtained whose slope is equal to $\frac{4\pi^2\varrho^2}{11.5\lambda^2}$. Since all the other quantities are known, it is now possible to solve for ϱ, the radius of the particles doing the scattering.

The plot of log I against R^2 for dental enamel is seen in Figure 5. R, a function of ϵ, is the distance from the beam center measured perpendicular to the main beam. There is a large portion of this curve which approximates a straight line, and the particle size calculated from the slope of this portion is 48 A. The curve changes abruptly from this low slope to a higher slope corresponding to a particle size of about 500 A. This abrupt change indicates a discontinuity in particle size from about 50 A. to about 500 A.

Another method of measuring the fineness of crystals is the study of the broadening of the roentgen-ray maxima. As mentioned before, a substance begins to give broad, rather than sharp, roentgen-ray maxima when its average crystal size goes below 10,000 A. The effect of crystallite size in broadening diffraction maxima is seen in the following equation (Jones[22]):

$$t = \frac{\lambda}{B \cos \theta}$$

where t = size of crystal,
λ = wave length of roentgen rays,
B = broadening of the maxima measured in angular half width,
and θ = angle of diffraction at maximum.

By this method it is possible to calculate the average crystal size of enamel apatite to be 500 A.

In this study of the particle size of enamel apatite, there is discontinuity in the sizes from about 50 A. to about 500 A. It is certain that the 500 A. particles are enamel apatite because these measurements were made on the broadening of characteristic diffraction maxima. Since 500 A. is a size appearing in both low-angle scattering and roentgen-ray line broadening measurements, the 50 A.

22. Jones, F. W. The measurement of particle size by the x-ray method. Proc. Roy. Soc., London A166:16, 1938.

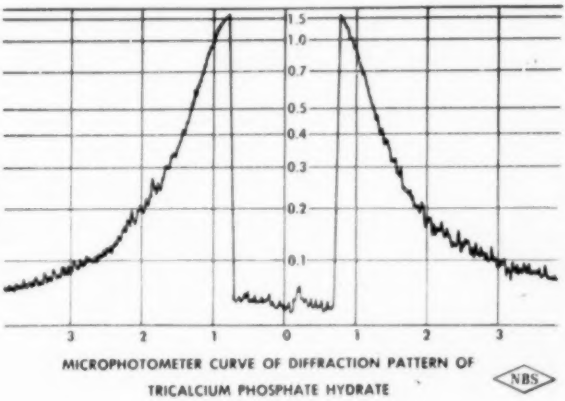


Fig. 4 • Curve showing intensity of scattering versus angle; obtained on sample of chemically precipitated tricalcium phosphate hydrate

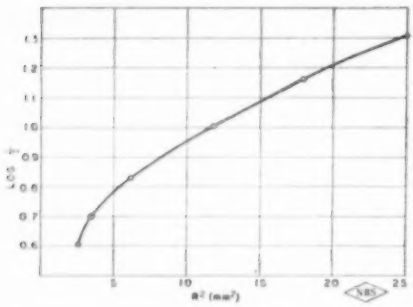


Fig. 5 • Plot of logarithm of scattered intensity versus square of a function of the scattering angle; obtained from low-angle scattering data on human enamel

particles are probably not apatite. If they were, the average crystal size as measured by line broadening would be lower than 500 A. Certainly more data are needed to say definitely whether the 50 A. particles are admixed carbonate or merely apatite particles. It is interesting, however, that such small particles do exist somewhere in the body of enamel apatite.

SUMMARY

The crystal chemistry of the inorganic portion of the enamel of human teeth is still under dispute. A general background of the crystallography involved is necessary for an understanding of arguments for and against the substitution of ions such as carbonate, fluoride, magnesium and others in the apatite structure. In regard to the matter of carbonate substitution, although facts have been presented on both sides, the data seem to indicate that the carbonate is included as a separate phase which is too small to be seen by the electron microscope or with normal roentgen-ray diffraction but which can be seen by low-angle scattering of roentgen rays. It is hoped that some day a better understanding of such fundamental problems as the structure of dental enamel will aid the clinician in dealing with many of his practical problems.

Health Education • The object of all health education is to change the conduct of individual men, women, and children by teaching them to care for their bodies well, and this instruction should be given throughout the entire period of their educational life. *C. H. Mayo, "When Does Disease Begin? Can This Be Determined by Health Examinations?" Minnesota Medicine 15:40, January, 1932.*

Pulp reaction to the insertion of self-curing acrylic resin filling materials

Louis I. Grossman, D.D.S., Dr. med. dent., Philadelphia

The reaction of the dental pulp to self-curing acrylic resin filling materials has been studied in the teeth of lower animals by Lefkowitz and others,[1] Seelig,[2] and Zander.[3] Although many dentists have observed either a transient pain or sensitivity to thermal changes after the insertion of self-curing acrylic resin fillings, there have been no reports of such pulp reaction in dental literature. In addition to transient reactions, the writer has observed a fairly large number of pulp deaths shortly after the insertion of such fillings. Since 1950, when self-curing acrylic resin filling materials became generally available, he has made the following observations: (1) pulp death occurs occasionally after the insertion of a self-curing acrylic resin filling; (2) the immediate cause of such pulp death is not apparent; (3) pulp death occurs regardless of the size or the depth of the cavity; (4) in the same mouth where several teeth have been filled with acrylic resin fillings, the pulp in one tooth may die for no apparent reason while the pulps in other teeth are not affected.

Lefkowitz, Seelig and Zander have stated that acrylic resins produce only slight pulp reaction, less than that produced by zinc phosphate cement. Their observations were based on experiments made on the teeth of monkeys or of dogs. Their findings differ from the observations which a number of dentists made on their clinical experiences with acrylic resin fillings inserted in teeth of human beings.

CAUSES OF PULP REACTION

What causes the pulp reaction in human teeth? Although no specific cause can be given, the following may be considered possible causes:

1. *Dentin Sterilizing Agent* • In general, when a filling material other than an acrylic resin is to be inserted, a phenolic compound, such as phenol, creosote or thymol, is used for sterilization of the dentin. Does this cauterize the dentinal fibrils adjacent to the cavity and so prevent a reaction between the filling material and the pulp? Thomas[4] has stated: "Metamorphosed dentin is not penetrated by phenol . . . the dentin under

Oral medicine department, School of Dentistry, University of Pennsylvania.

1. Lefkowitz, William; Seelig, Alexander, and Zachrisky, Leo. Pulp response to a self-curing acrylic filling material. New York D.J. 15:376 (Aug.-Sept.) 1949.

2. Seelig, Alexander, and Lefkowitz, William. Pulp response to filling materials. New York D.J. 16:540 (Dec.) 1950.

3. Zander, H. A. Effect of self-curing resins on the dental pulp. Oral Surg., Oral Med. & Oral Path. 4:1563 (Dec.) 1951.

4. Thomas, B. O. A. Penetration of phenol in tooth structure. J. D. Res. 20:435 (Oct.) 1941.

carious lesions, as well as secondary lesions, is not so well penetrated."

When a self-curing acrylic resin is to be used, phenolic compounds cannot be employed because they interfere with the setting of the filling material. Instead, hydrogen peroxide, Superoxol or alcohol is generally used. These agents probably do not cauterize the dentinal fibrils in the manner of a phenolic compound and therefore may permit diffusion of the destructive agent contained in the acrylic resin by way of the dentinal fibrils to the pulp.

2. *Cavity Preparation* • Because self-curing acrylic resins have no adhesive properties and because their coefficient of expansion is greater than that of tooth structure, additional retention has been advocated when these fillings are inserted. Does such cavity preparation bring the filling material in closer proximity to the pulp? It is questionable that it does even when a silicate is replaced by a self-curing acrylic resin, for retention is secured laterally near the margins of the cavity rather than towards the pulp.

3. *Heat* • As all self-curing acrylic resins depend on "self-generated" heat for polymerization, this factor must be considered as a possible cause of irritation. According to thermocouple readings made by Wolcott,[5] the average rise in temperature for a Class III restoration is only about 7 or 8° F. above mouth temperature. In a case where an entire crown was restored with this material, the peak temperature rise was great enough to cause irreparable injury to the pulp. Wolcott observed an even greater rise in temperature when water was added to the monomer. Is it possible that at the time of insertion of the filling material the presence of a small amount of moisture in the cavity such as might be occasioned by accidental contamination with saliva may increase the peak rise in temperature and so affect the pulp adversely?

4. *Shrinkage* • Self-curing acrylic resins expand or contract from five to seven times the amount of expansion or contraction of tooth structure for every degree of change in temperature. According to Peyton,[6] the shrinkage of self-curing acrylic resin is from 0.2 to 0.4 per cent. Silicates shrink considerably less, only from 0.03 to 0.25 per cent. When foods such as coffee or ice cream—particularly when taken immediately after one another—are eaten, considerable dimensional change may occur with likelihood of leakage at the margins. While such peripheral leakage may result in transient episodes of sensitivity, it would not be expected to cause pulp death over a relatively short period of time. In some cases, pulps have died within a few days after the insertion of self-curing acrylic resin fillings. If shrinkage does permit microorganisms to seep in at the margin, they may irritate the pulp and eventually cause its death. Water sorption of acrylic resins is relatively high, and sufficient saliva could leak in at the margin and through the body of the filling to maintain the viability of the microorganisms.

5. *Accelerator* • In addition to methyl methacrylate monomer and polymer, self-curing acrylic resin filling materials contain a catalyst such as benzoyl peroxide, an accelerator which is a tertiary amine and an inhibitor such as hydroquinone. Any one of these agents is likely to have an irritating effect on the pulp, but the most likely one is the tertiary amine. While there are a number of tertiary amines which accelerate the setting of methyl methacrylate, N-trihexyl amine or dimethyl paratoluidine is generally used. As a group, the tertiary

5. Wolcott, R. B.; Paffenbarger, G. C., and Schoonover, I. C.: Direct resinous filling materials: temperature rise during polymerization. J.A.D.A. 42:253 (March) 1951.

6. Peyton, F. A.: "Self-curing" resins for direct inlays. J. Michigan D. Soc. 32:32 (Feb.) 1950.

aromatic amines are explosive compounds which must be handled with great care during the formation of self-curing acrylic resin filling materials. The possibility that this agent, benzoyl peroxide or hydroquinone may be the source of irritation, which in some cases is sufficient to cause pulp death, deserves careful study.

6. *Particle Distribution* • It has already been mentioned that several acrylic resin fillings may be inserted in the same mouth and yet the pulp of only one tooth becomes irritated, also that at times pulps become irritated or die regardless of the depth of the cavity. In one case, a superficial cavity had been prepared only to the depth of the amelodentinal junction; yet the tooth became sensitive and the pulp eventually died. There were no other cavities or fillings in the tooth. It is possible that the cause may have been an excess of tertiary amine in some portion of the filling as a result of poor distribution of the accelerator. This factor might help to explain also why some pulps are irritated and others are not.

7. *Impurities* • The composition of self-curing acrylic resins is rather complex; any one of the ingredients may contain some impurity which can prove to be irritating to the pulp. For example, during the early days of the development of self-curing acrylic resins, Slack[7] cautioned against the use of "monomers of doubtful purity . . . . [which] may contain traces of methylacrylate, acrylic or formic acid." Even a trace of formic acid would be highly irritating to vital tissue and conceivably could kill the pulp tissue if present in the filling material. In addition, amines, which have varying grades of toxicity, are used in the monomer; and these, too, might be irritating to dentinal fibrils.

While it must be concluded at this time that the cause of pulp irritation from self-curing acrylic resin filling materials is unknown, it has been the clinical experience of a number of dentists that pulps become irritated, and in some cases die, after the insertion of such filling materials.

QUESTIONNAIRE

Because pulp death occurs infrequently and the general practitioner might seldom have the opportunity to observe such a reaction, it was decided to pool the experiences of a large number of dentists. Accordingly, the following questionnaire was prepared by the author and was sent by the Philadelphia Academy of Stomatology to all its members in an effort to determine how often such reactions occurred.

1. a. Do you use self-curing acrylic filling material?
   b. For how long a time have you used it?
2. a. Have you observed any discomfort or pain following its use?
   b. How long does the discomfort or pain generally continue?
3. a. Has it been necessary to remove any fillings because of pulp reaction?
   b. In how many cases during the last six months?
4. a. Were the fillings inserted by the pressure technic?
   b. By the brush technic?
5. a. Have you observed any pulp deaths that are directly attributable to self-curing acrylics?
   b. In how many cases during the last six months?
6. Do you use a cement base prior to the insertion of self-curing acrylics? (1) In deep cavities only? (2) In medium-deep cavities also?
7. Approximately how many self-curing acrylic fillings have you inserted during the last six months?

In an effort to determine whether the incidence of pulp reactions from the insertion of acrylics is any greater than that following the insertion of silicate cement, it would be appreciated if the following questions were answered:

8. a. Approximately how many silicate fillings have you inserted during the last six months?

7. Slack, F. A., Jr. Present research status of direct acrylic restorations. J.A.D.A. 30:1233 (Aug.) 1943.

b. Have you observed any discomfort or pain following the insertion of silicates during this time?

c. Have you observed any pulp deaths following the insertion of silicates during the last six months?

d. In how many cases?

The questionnaire was designed to determine the relative frequency of pulp reaction after the insertion of self-curing acrylic resins and of silicates for the same period of time, which in this study was six months. The reaction to silicates served as a control for the reaction to self-curing acrylic resins. Ninety-two questionnaires were received; of this number 16 had to be discarded because of insufficient or inadequate information. Of the 76 replying satisfactorily to the questionnaire, 75 used self-curing acrylic resins and 70 used silicates. Fifty-three of the 75 using self-curing acrylic resins observed discomfort or pain after the teeth were filled; the occurrence of pain varied from "very seldom" or "rarely" to "frequently" or "occasionally." Twenty-two stated that no pain or discomfort was present during the insertion of the acrylic resin fillings. In respect to the duration of pain, 25 replied that pain lasted one to two days; nine stated that it lasted from one to three weeks; eight replied "until the filling and the pulp were removed"; others replied simply that the duration of symptoms varied.

Regarding the technic used, all 75 stated that they used the pressure technic; 13 stated that they used the brush technic; of this latter number, 7 qualified their statements with "in a small number of cases" or "only recently."

Seventy-two of the 75 used self-curing acrylic resins in deep cavities; 21 used them in medium deep cavities; 11 used them occasionally in medium deep cavities; 22 did not use this type of filling material in medium deep cavities; 21 were noncommittal.

During the six month period prior to receipt of the questionnaire, 11,050 self-curing acrylic resin fillings were inserted by these 75 dentists; and 9,086 silicate fillings were inserted by 70 dentists of this group. The average was 147 acrylic resin fillings and 129 silicate fillings per dentist for a six month period, or an average of one plus acrylic resin fillings and one silicate filling per working day.

As for the main point of the questionnaire, the incidence of pulp deaths, there were 93 cases in which the pulp died after the insertion of self-curing acrylic resin fillings and 21 cases in which the pulp had to be removed after insertion of silicate fillings. In terms of percentage, pulp removal was necessary in .84 per cent of cases in which acrylic resin fillings had been inserted and in .22 per cent of cases where silicate fillings had been inserted. In other words, for each 1,000 fillings, pulp death occurred in 8.4 teeth in which acrylics had been inserted and in 2.2 teeth in which silicates had been inserted. There were, therefore, about four times as many cases in which pulps died after the insertion of self-curing acrylic resin fillings as after the insertion of silicate fillings.

The following are some of the unsolicited remarks made by those who answered the questionnaire:

No cement base had been used by former dentist, and patient had pain after insertion of acrylic filling. Ten days later pulp was dead.

I have had one pulp death in one of my earlier fillings without a base.

Do not think reported pulpal deaths from plastics is from irritant of the plastics but from leakage and subsequent decay around restoration.

In my own mouth a tooth filled for 30 years with silicate was sensitive for 10 days following filling with self-curing acrylic—no cement step was used.

Have never had so many pulp deaths under fillings as happened after use of self-curing acrylics. As a result I rarely use it in a vital tooth.

After the first 6 months and 5 pulp deaths with abscesses, I began lining every cavity.

No further pulp reaction with acrylic since using protective lining in deep or medium deep cavities.

The one death of pulp under an acrylic filling was due to placing it too close to pulp without a cement lining.

DISCUSSION

There is convincing evidence that a self-curing acrylic resin filling material is irritating to the dentin and at times may be sufficiently irritating to the pulp to destroy that organ. This observation has been confirmed not only by the dentists who replied to the questionnaire but by groups of dentists in various parts of the country before whom the author has lectured and whom he has asked these questions: Have you observed pulp irritation associated with recently inserted self-curing acrylic resin fillings? Have you observed any pulp deaths? The responses from the questionnaire were not in accordance with the findings of Lefkowitz and Zander in experiments on teeth of lower animals; in these experiments they placed self-curing acrylic resin fillings, sacrificed the animals after varying periods of time and then examined the pulp tissue. Contrary to their statement that acrylic resins are less irritating than zinc phosphate cement, a number of dentists observed: (1) that pulp irritation occurred when acrylic resin fillings were placed against the bare dentin but not when a cement base was used; and (2) that whereas a number of pulps died in cases where cement bases had not been used, pulp deaths did not occur after the insertion of filling material of this type when cement bases were used.

SUMMARY

This study was undertaken with the object of determining the incidence of pulp death following the insertion of self-curing acrylic resin fillings. As a control, the incidence of pulp deaths following the insertion of silicate fillings for the same period of time was used. It was found that there were approximately four times as many pulp deaths after self-curing acrylic resin fillings were inserted as after silicate fillings were used. The cause of these pulp deaths has not been determined, but several possible causes have been considered. When a zinc phosphate cement base was used, neither pulp irritation nor pulp death was observed, regardless of whether the filling material was acrylic resin or silicate. It is therefore recommended that a cement base be used in all cases where a self-curing acrylic resin filling is to be used.

The Danger of Complacency • The fixed idea of the opinionated is as dangerous as a blunt instrument. The complacency of the incurious is a kind of death in life. ***Donald Culross Peattie, "Words to Live By," This Week Magazine, January 26, 1952.***

Filling the root canals of molar teeth with silver wires

M. B. Auerbach, D.D.S., New York

Clinical success with root canal treatment of molars justifies a more frequent use of endodontic procedures for the molars. Nature aids the dentist in his work with molars as well as with anterior teeth provided that the proper precautions are observed and the proper procedures are employed.

In the past, the very thought of endodontic treatment of a molar has alarmed many dentists, in whose minds a sort of psychological barrier was set up against such treatment. A proper rationale of treatment assiduously adhered to removes the mental block. The practitioner learns that the molar can be treated with equally as satisfactory results as anterior teeth.

Dentists agree that the patient's own teeth are preferable to any restoration, that a fixed bridge is preferable to a partial denture and that a partial denture is preferable to a full denture. The proper endodontic treatment of an involved molar may well mean, therefore, the difference in a patient's mouth between the use of one type of restoration and a less favorable one.

Most of the recent contributions to the endodontic literature have been directed toward the therapeutic aspect. The assumption seems to be that all operators are equally qualified in the technical procedures. There has been a tendency to stress the reduction of treatment time rather than to discuss sound operative methods which, once perfected, could in themselves decrease dependency on therapeutic medications. Therapeutic measures have come to be stressed more and more as the panacea for all root canal problems, while the requirements for operative technics have become less and less exacting. It is the author's belief that the antibiotics should be employed as an auxiliary measure rather than as the main course of treatment. As in surgery, the operative procedures play the major part in therapy, with the antibiotic medications acting in a supporting role. As operative procedures become sounder, there is less dependence on medications.

The ultimate goal in root canal therapy is to obliterate the root canal space. In all root canal fillings two materials are employed: (1) a solid material to fill the bulk of the space and (2) a semisolid material to fill the dentinal tubules and the spaces that are not reached by the solid material. When gutta-percha and chloropercha are used, the gutta-percha cone is the solid material while the chloropercha is the semisolid material. In the procedures for silver wire fillings, the silver wire is the solid material and the silver cement is the semisolid material.

Assistant professor of pulp canal therapy, New York University, College of Dentistry.

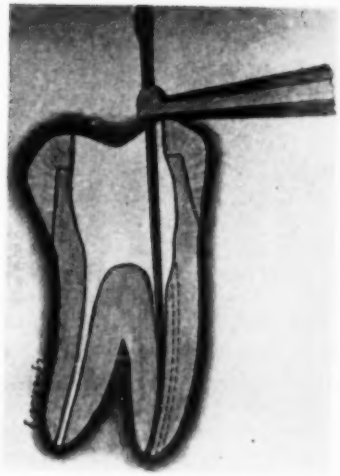


Fig. 1 • Silver wire, held by Howe pliers, being fitted to canal. When fitted, wire is measured to height of cusp, as illustrated

Gutta-percha in combination with chloropercha is one of the oldest substances used for root canal fillings and in most respects fulfills the requirements for an ideal root canal filling. It is in the filling of extremely narrow canals that gutta-percha loses its advantages. Narrow canals are found in upper first bicuspids, lower anterior teeth, mesial canals of lower molars and buccal canals of upper molars. In these canals the gutta-percha points tend to buckle, leaving a canal filled primarily with chloropercha. The lack of solidity may permit the entrance of tissue fluids into the canals. For such extremely narrow root canals, procedures in which silver wire fillings are used have been developed. Silver wire fillings, properly placed, have been found to be more accurate, easier to manipulate and generally superior to gutta-percha in these special cases. The silver wire filling has become the filling of choice in these narrow canals.

The use of metals for the filling of root canals dates back to 1830 when Hudson of Philadelphia employed gold for this purpose. For a long time the use of silver cones was advocated because of what was believed to be a bactericidal effect resulting from the oligodynamic action of silver. In 1933, Jasper[1] developed silver cones which corresponded in size with root canal instruments.

1. Jasper, E. A. Root-canal therapy in modern dentistry. D. Cosmos 75:823 (Sept.) 1933.

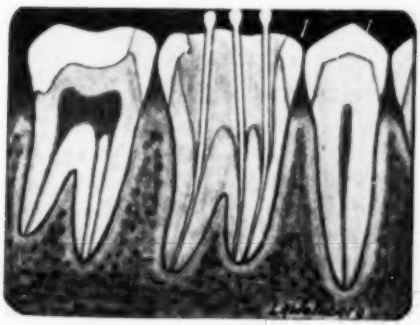
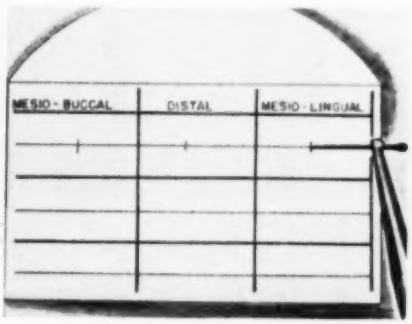


Fig. 2 • Diagram of roentgenogram of silver wires fitted into canals

Fig. 3 • Measurement control envelope. Length of silver wire is recorded, and wire is placed in envelope. Additional lines provide for corrected measurements



In the past, several difficulties were encountered in the use of silver wires. The major difficulty was that of confining the silver wire to the root canal. The wire has often been observed to pass through the apical foramen with a resultant overfilling. This overfilling is not necessarily harmful since silver is compatible with periapical tissues. Since teeth move in function, however, the protruding portion of the silver wire can act as a source of irritation and result in pain. Periapical regions of infection have been known to result from such irritation.

Another difficulty encountered was the management of the portion of the wires left protruding into the pulp chamber. This was a serious problem for two reasons: (1) Any bending of this portion of the wire with an instrument may cause a protrusion of the point beyond the apical foramen. (2) If the coronal extension of the silver wire is not reduced by cutting or bending, the entire wire may be loosened or dislodged by instrumentation when the tooth is being prepared for a restoration.

For these problems a solution has been found which has served satisfactorily in facilitating the filling of root canals in molars. When all the prefilling phases of endodontic treatment have been completed and the tooth meets all the requirements indicating that it is ready to receive the filling, silver points are fitted to the canals. The silver points, already sterilized, are kept sterile by immersion in germicidal solution. Throughout this procedure the silver wires are regarded as sterile instruments and must be resterilized from time to time to insure the maintenance of asepsis.

The final success of the root canal filling depends on the selection, adjustment and adaptation of the silver wires at this stage. Each wire must extend to

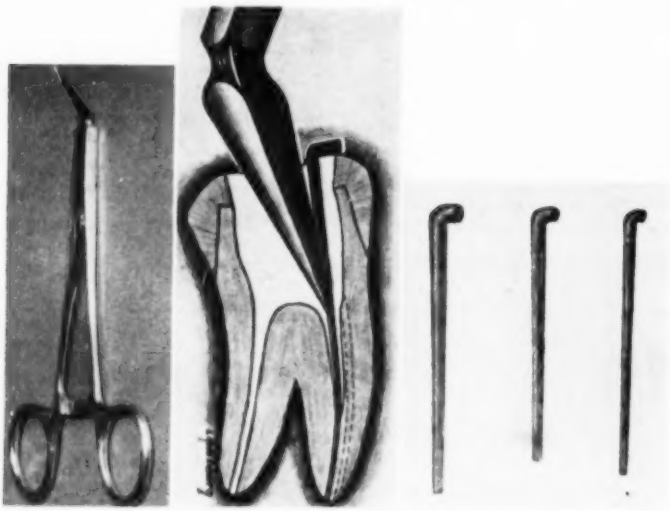


Fig. 4 • Left: Splinter forceps. Long, tapering beaks permit handling of silver wires in pulp chamber. Center: Splinter forceps grasping fitted silver wire at canal opening, ready to withdraw wire. Right: Three silver wires ready to be cemented after being measured for each canal from apex to canal opening at floor of pulp chamber

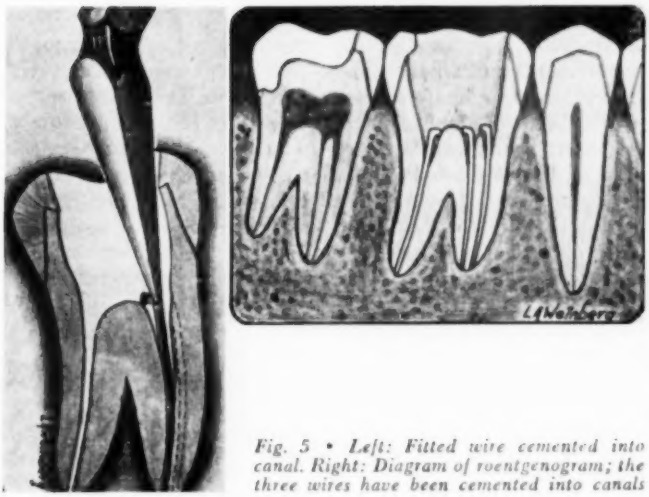


Fig. 5 • Left: Fitted wire cemented into canal. Right: Diagram of roentgenogram; the three wires have been cemented into canals

the apex and must fit snugly. Each wire must fill the canal as completely as possible in length as well as in width. Each wire, when finally adapted, requires pressure to force it to the apex, so that no pressure which may be applied later will cause it to pass through the periapical foramen.

During this period of adjustment, the wires are handled with a pair of pliers (Howe pliers), so that pressure can be applied (Fig. 1). A wire is fitted for each of the three canals, and a roentgenogram is taken to check the apical fit (Fig. 2). When the roentgenogram shows that the three wires fit the canals satisfactorily, they are removed from the tooth. Each wire is removed with the Howe pliers, with the beaks held at the height of a cusp. The wire is held against a measurement guide envelope designed for this purpose (Fig. 3). The length is recorded, a right angle bend is made at the beaks of the pliers, and the wire is placed in the envelope. When this has been done for all three wires, the dentist has a recorded measurement of the three wires and the wires themselves in the envelope.

The dentist is now ready to start the next stage in preparing the silver wires for final cementation. Each wire is prepared separately. With the Howe pliers, the silver wire is firmly placed into its canal. Then the Howe pliers are laid aside, and the splinter forceps is used (Fig. 4, left). This instrument has long tapering beaks and a locking handle which permits locking the wire in the beaks. The wire is grasped at the opening of the canal at the floor of the pulp chamber (Fig. 4, center). The beaks are locked and the wire is withdrawn. Next, the wire is bent at the tip of the beaks and then cut. A slight curved extension must be allowed so that the wire can be grasped again. When this operation has been completed for the other wires in turn, there are three silver wires, each well adapted to its canal, snug-fitting and reaching without excess from the apex to the floor of the pulp chamber (Fig. 4, right). There is now no danger of overfilling nor of excess wire in the pulp chamber. The wires are placed in the sterilizing solution while the silver cement is being prepared.

The silver cement is mixed to the consistency of zinc oxyphosphate cement prepared for cementing an inlay. The cement is carried to the canal on paper points, and the walls of the canal are lined with it carefully. Previously, root canal pluggers or files were used for this purpose. It was observed, however, that the cement was improperly distributed and that much of it was removed on the instrument at withdrawal. Paper points, which are narrower than the canal, appear to serve this purpose best. One silver wire is now removed from the sterilizing solution by means of cotton pliers and dried on a sterile gauze pad. It is picked up in the beaks of the splinter forceps with a pen grasp, passed through the mix of silver cement so that it is covered completely and is placed firmly in position in the canal (Fig. 5, left). This process is repeated for the other silver wires. When the positions of the wires have been checked by means of roentgenograms, the pulp chamber is filled with cement (Fig. 5, right).

When the objectives are understood, endodontic procedures can be systematized in the same manner in which most dentists systematize their technics in other branches of dentistry. Definite objectives in filling the root canals of a molar can be achieved with a systematic use of instruments and materials.

Effects of various instruments on enamel walls

Edmund V. Street, D.D.S., San Francisco

As yet little information has been published concerning the effects produced by various cutting instruments on the surfaces of the enamel walls of cavities. It appears that most of the direct observations and the comments in the literature have been based on clinical experience only and that most of the quotations have been taken from empirical statements.

Though occasionally opinions have been expressed as to the treatment of enamel walls with chisels and stones, references to the use of burs have appeared rarely. On this subject Arthur B. Gabel[1] in the *American Textbook of Operative Dentistry* commented:

Some operators prefer to plane the enamel walls and bevel the cavosurface angles with stones and finishing burs, feeling that this method gives a smoother surface. The experiments of some investigators, however, seem to show that these methods have no advantage over the chisel or its equivalent. In fact, they conclude that, unless special care as to direction of rotation of the stone is taken, the result is far inferior to that obtained with the chisel. The rods break out of the wall if the stone is rotated from the dentin toward the outer enamel surface. In addition, the abrasives produce scratches in the surface which require polishing in order

Associate clinical professor of operative dentistry, College of Dentistry, University of California.

1. Ward, Marcus L. American textbook of operative dentistry. Philadelphia, Lee & Febiger, 1940, p. 240-242.

to produce a smooth surface. It seems reasonable to suppose that the smoothness of the enamel wall planed with the chisel is determined largely by the diameter of the rods while the size of the crystals in the abrasive determine this surface when stones are used.

He stated also:

Present knowledge of the behavior of enamel under stress does not permit a definite statement of what happens when the edge of a blade is applied to its surface with sufficient force to rupture it. In view of the minuteness of the enamel rods compared to the thickness of the edge of the blade, it does not seem possible that the latter can enter between the rods and wedge them apart. What probably happens is that the edge of the blade produces a compressive strain in all directions in the enamel. As the strain on each side of the edge of the blade, parallel to the enamel surface, is away from the blade, hence in opposite directions, the cementing substance ruptures at this point, splitting the rods on the cavity wall away from the main body of the enamel. The sharper the blade the smaller is the surface engaged and the greater the strain for a given applied force.

Hopewell-Smith[2] explained:

the strength of the enamel is generally sufficiently great to prevent damage when a chisel is forcibly applied to its surface. However, at the edge of a cavity already disintegrated by dental caries, of course it breaks off quite easily the ends of the rods, and is much too large to cleave them in an inter-columnar direction.

Volume II of Black's *Operative Dentistry* in the edition revised by A. D. Black[3] reads as follows:

Carborundum stones of fine grits are used for trimming cavity walls and particularly the enamel walls. They smooth enamel very effectively and are preferred by some operators for finishing enamel walls. They should be used at high speed and with very slight pressure, and should be kept wet with water from a syringe.

Stephan[4] was of the opinion that cleavage of enamel could be accomplished with chisels and hoes when the rods were straight and enamel undermined but that too often "gnarled,

2. Hopewell-Smith, Arthur. Concerning human enamel: facts, explanations and applications. D. Cosmos 69:360 April 1927.

3. Black, A. D. G. V. Black's work on operative dentistry with which his special dental pathology is combined, vol. 2, ed. 7. Chicago, Medico-Dental Publishing Co., 1936, p. 110.

4. Stephan, John F. The enamel margin for fillings. J.A.D.A. 15:203 Feb. 1928.

Table • Variable factors in preparation of specimens

INSTRUMENT		Rotational speed Revolutions per min.				Condition	
		300	600	1,500	3,400	Dry	Wet
No. 558	S.S. White crosscut fissure bur	x	x	x	x	x	x
No. 702	S.S. White crosscut tapered bur	x	x	x	x	x	x
No. 58	S.S. White plain straight bur	x	x	x	x	x	x
No. 600	S.S. White plain tapered bur	x	x	x	x	x	x
	Baker carborundum stone	x	x	x	x	x	x
No. 14	Chayes carborundum stone	x	x	x	x	x	x
No. 26	Miller carborundum stone	x	x	x	x	x	x
No. 36	S.S. White carborundum stone	x	x	x	x	x	x
⅞"	Baker carborundum disk	x	x	x	x	x	x
⅝"	S.S. White sandpaper disk No. 00 (fine grit)	x	x	x	x	x	
⅝"	S.S. White sandpaper disk No. 0 (medium grit)	x	x	x	x	x	
⅝"	S.S. White sandpaper disk No. 1/2 (coarse grit)	x	x	x	x	x	
¾"	Starlite diamond disk				*	x	x
¾"	Densco diamond disk				*	x	x
No. 2F	Densco diamond instrument				*	x	x
No. 15	width Wedelstaedt chisel					x	
No. 15	width hingnale chisel					x	

*Speed increased to approximately 5,000 rpm.

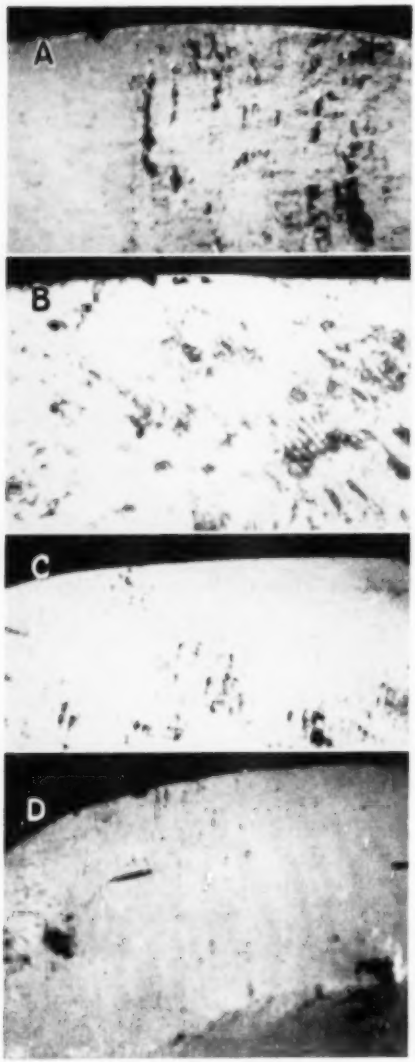


Fig. 1 • Specimens prepared with burs. A: With no. 558 crosscut fissure bur; 3,400 rpm; dry field; magnification 37×. B: With no. 702 tapered crosscut fissure bur; 3,400 rpm; wet field; 37×. C: With no. 58 plain fissure bur; 3,400 rpm.; wet field; 37×. D: With no. 600 plain tapered fissure bur; 1,500 rpm; dry field; 37×

curled or much twisted" prisms were encountered which could be cut more easily with burs and stones.

In the volume *Gold Inlays by the Indirect System* Gillett and Irving[5] took issue with Stephan's[4] view on the subject of chipped enamel margins. They attributed the rough and irregular surfaces to the loss of enamel during the preparation of microscopic sections rather than to the effects produced by the planing with sharp chisels. They found that the opinion of a competent practitioner to whom prepared sections had been submitted for microscopic examination was that "the appearance of the chisel prepared margins was equally as good as that of margins prepared with carborundum stones or disks. . . . " Gillett and Irving commented further:

> On the plane surfaces, the scratches made by the crystals composing stones that are as fine as is consistent with prompt execution of the work, are more noticeable than the markings left by the chisels; the chisels left a smoother surface.

MATERIALS AND PROCEDURES

With the aid of Harry E. Frisbie, a laboratory study was made to determine the effects produced on the enamel walls of extracted teeth when cut with various types of burs, stones, disks and chisels.

One hundred and eight teeth were cut longitudinally into halves. The cut surfaces were ground flat against a carborundum stone and were finished on the surface of an Arkansas stone. These specimens were kept moist at all times.

In the final preparation of specimens, rotational speeds of the motor-driven instruments were varied; and with the exception of the sandpaper disks, operations were performed both under dry and wet conditions. Moisture was supplied by dropping water at room tempera-

5. Gillett, H. W., and Irving, A. J. Gold inlays by the indirect system. Brooklyn, Dental Items of Interest Publishing Co., 1932, p. 222, 224.

6. Eyepiece manufactured by Bausch and Lomb.

ture on the tooth surface during rotation of the instrument. Instruments were inserted in a regulation handpiece, attached to a bench lathe and held against the smooth enamel surface in the same plane as that determined for an operation on the tooth in the mouth.

For each bur, stone and disk used, four rotational speeds were employed under both wet and dry conditions. This procedure gave eight specific preparations with each revolving instrument. Eleven surfaces were planed by six members of the operative division at the College by means of Wedelstaedt and binangle chisels. The data of the experiment are summarized in the table.

In order to show more clearly the width of the scratches produced by the instrumentation, each section was coated with a paste made of lamp black and alcohol. When the paste had dried, the surface was wiped with a piece of unvulcanized rubber to remove the excess so that a residue of the lamp black was left in the scratches or grooves made by the instrument.

OBSERVATIONS

The prepared specimens were viewed microscopically at various magnifications. All photographs were taken with a Zeisz 3 centimeter achromatic objective and a 15× periplan eyepiece.[6]

The no. 558 crosscut fissure bur caused irregular notched areas which were not deep (Fig. 1, A) nor as wide as those made with the no. 702 tapered crosscut bur (Fig. 1, B). The no. 58 plain fissure bur left only minute nicks (Fig. 1, C), and the no. 600 plain tapered fissure bur produced similar results (Fig. 1, D).

The enamel surfaces of sections cut with mounted carborundum stones presented some rather wide variations. One make of stone made numerous light scores (Fig. 2, A). A second produced a combination of light marks and an occasional heavier indentation (Fig. 2, B).

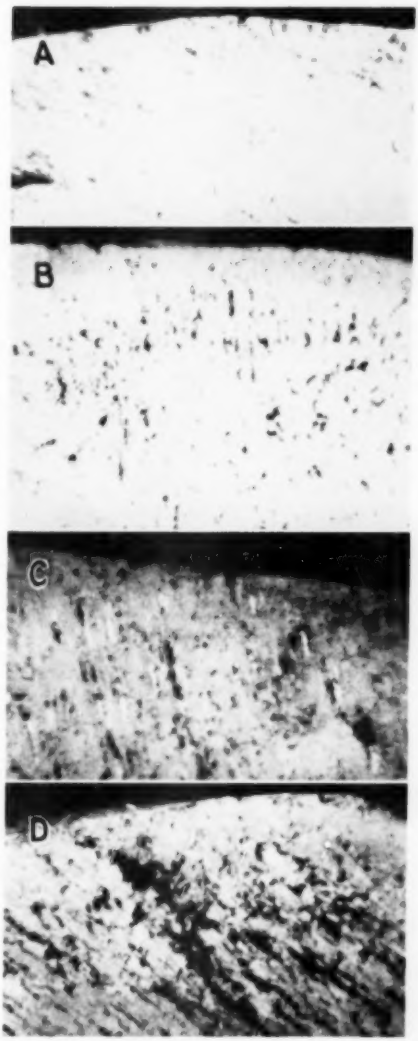


Fig. 2 • Specimens prepared with carborundum stones. A: With Baker cylinder-shaped carborundum stone; 1,500 rpm; wet field; magnification 37×. B: With Chayes cylinder-shaped carborundum stone; 3,400 rpm; dry field; magnification 37×. C: With Miller cylinder-shaped carborundum stone; 600 rpm; wet field; magnification 37×. D: With S. S. White cylinder-shaped carborundum stone; 1,500 rpm; dry field; magnification 37×.

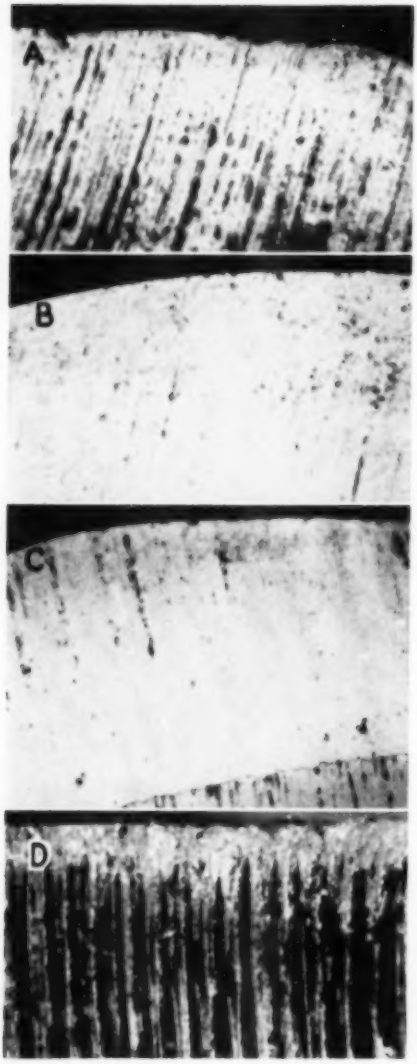


Fig. 3 • Specimens prepared with disks. A: With 7/8 inch carborundum disk; 300 rpm; wet field; magnification 37×. B: With fine grit sandpaper disk; 3,400 rpm; magnification 37×. C: With coarse grit sandpaper disk; 3,400 rpm; magnification 37×. D: With 3/4 inch diamond disk; 5,000 rpm; wet field; magnification 37×

Another left numerous nicks, some shallow and some deep (Fig. 2, C). The fourth produced numerous irregular nicks and frequent deeply scored areas (Fig. 2, D).

The carborundum disk (Joe Dandy) produced numerous furrows of varying width, not always uniformly spaced (Fig. 3, A). The fine sandpaper disk left the enamel almost free of any scratches (Fig. 3, B) while the coarse sandpaper disk (Fig. 3, C) produced furrows of varying width and depth similar to, but not as pronounced as, those made with the carborundum disk. The furrows of the tooth sections cut with the diamond-impregnated three-fourths inch disk were similar to but definitely wider than those made by the carborundum disk (Fig. 3, D). The section cut with the cylindrical diamond instrument had more notched areas than the sections cut with the chisels.

The microscope revealed many notched areas of various widths on the sections prepared with the Wedelstaedt and binangle chisels. Some of the surfaces appeared similar to those prepared with the rather rough-cutting stones (Fig. 4).

DISCUSSION

The maintenance of wet or dry conditions in the finishing of the enamel surfaces with burs or disks effected negligible differences in the specimens. Likewise, the speed of rotation did not appreciably vary the appearance.

Little difference was noted in the fragmenting of enamel margins by the rotational direction of the stone. Carborundum stones as supplied by the manufacturer are not always true and when rotated might easily break off minute portions of the enamel at the margin. This may be true likewise of fissure burs. It must always be recognized also that a badly worn straight handpiece or contra-angle will transmit vibrations to the cutting instrument.

Previously authors have stated that rods break out of the wall if the stone is rotated toward the outer enamel surface.

Although the fine sandpaper disk produces the smoothest surface, there are problems connected with its use. It bends when held firmly against the tooth wall so that a slight concavity of the surface results. Another difficulty is the necessity of maintaining a perfectly dry field in order to obtain the maximum cutting effect. With the application of the rubber dam there is always danger that the fast-revolving disk may catch and tear the rubber.

The irregularities on the finished surfaces of the enamel, such as the grooves and scratches left by cutting instruments, might be of some value from a retentive standpoint, for instance, when an amalgam or even gold foil is used. Furthermore they might aid in the retention of an inlay through the locking effect of the cement. There is the possibility also that these notched areas may extend to the margin of the cavity and result in a cement line subject to dissolution and later a defect at the margin of the inlay.

The sections finished with chisels presented a rather disappointing picture with their large nicks and irregular gouges. In the teaching of operative technics to dental students, emphasis is placed on the use of chisels to obtain smooth or planed surfaces on enamel walls or margins. Examination of the specimens made in this study failed to substantiate the reasoning behind this procedure. The opinions expressed by some observers that the chisels leave the smoothest finished surface are certainly not accompanied by any statistical data.

No observable variations were recognized as being due to the varying hardness of enamel nor to the rod direction.

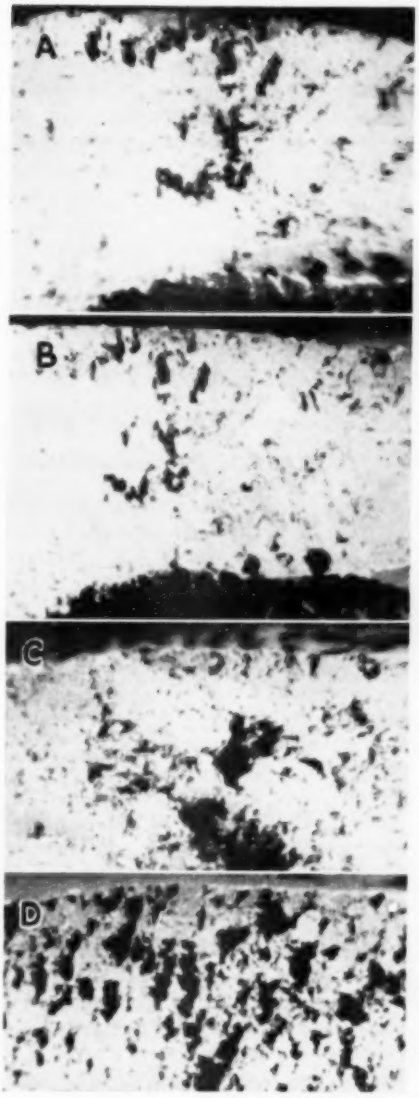


Fig. 4 • Effects on enamel when subjected to light shaving strokes with sharp no. 15 width Wedelstaedt or binangle chisels; surfaces with large nicks and irregular gouges appear similar to those prepared with rather rough-cutting stones

SUMMARY

The enamel surfaces of one hundred and eight extracted teeth were cut with the

instruments usually employed in everyday dental practice.

The sandpaper disk produced the smoothest finished surface. The fissure burs did not nick the enamel nearly as much as the mounted carborundum stones.

The grooves left by the carborundum and diamond disks were quite prominent.

Indentations, made when sharp chisels were used, did not confirm the hypothesis that a smooth surface on the enamel wall of a cavity can be produced with such instruments.

Evaluation of a dentifrice containing carbamide and urease

R. R. Hawes, D.D.S., and B. G. Bibby,† D.M.D., Ph.D., Rochester, N. Y.*

On the basis of somewhat inadequate evidence, it has been claimed by Kesel and his co-workers,[1] by Henschel[2] and by others that the regular use of an ammoniated dentifrice reduces the number of oral lactobacilli, increases the buffer capacity of saliva (or of the dental plaque) and reduces the incidence of dental caries. Although the recommended concentrations differ, the principal active ingredient of the ammoniated dentifrices is urea (carbamide), to which dibasic ammonium phosphate is added to augment the supposed therapeutic properties.

The choice of these particular substances apparently stems from the observations of Grove and Grove[3] that there is a higher ammonia content in saliva from caries-free than in that from caries-susceptible persons. Among other investigators, Ludwick and Fosdick,[4] and Youngberg[5] have failed to duplicate these findings, although the former authors suggest the possibility that the ammonia concentrations on individual tooth surfaces may be altogether different from the concentration of the whole stimulated saliva and that such local concentrations may be related to caries immunity.

Some laboratory studies, for example, that of Kesel,[6] of the effect of ammonium salts and urea on pure cultures of oral lactobacilli indicate that low concentrations of either substance stimulate lactate production. In Kesel's study, however, when ammonium salts and urea were

*First lieutenant, Randolph Air Force Base, Texas.

†Director, Eastman Dental Dispensary, Rochester, N. Y.

1. Kesel, R. G., and others. Biological production and therapeutic use of ammonia in the oral cavity in relation to dental caries prevention. J.A.D.A. 33:695 June 1946.

2. Henschel, C. J. Caries control by chemical prophylaxis. New York J. Den. 16:102 March 1946.

3. Grove, Carl J., and Grove, Carl T. Chemical study of human saliva indicating that ammonia is an immunizing factor in dental caries. J.A.D.A. 22:247 Feb. 1935.

4. Ludwick, W. E., and Fosdick, L. S. Ammonia content of the mouth. J. D. Res. 29:38 Feb. 1950.

5. Youngburg, Guy E. Salivary ammonia and its relation to dental caries. J. D. Res. 15:247 Sept. 1936.

6. Kesel, R. G. Effectiveness of dentifrices, mouthwashes, and ammonia-urea compounds in the control of dental caries. J. D. Res. 27:244 April 1948.

combined or when a high concentration of urea alone was used, there was a suppression of lactate formation and the pH of the culture remained alkaline. On the basis of his findings, Kesel concluded that there was a specific inhibition of lactobacilli by the ammonium ion; therefore, he recommended 3.0 per cent urea and 5.0 per cent dibasic ammonium phosphate as the active ingredients in a dentifrice formula. Henschel and Lieber,[7,8] on the other hand, suggested the use of 22.5 per cent urea with 5.0 per cent dibasic ammonium phosphate; but they did not offer any scientific evidence for selecting these concentrations.

The recent investigations of Pearlman[9] and Jenkins and Wright[10] cast considerable doubt on the specific capacity of the ammonium ion to inhibit the oral lactobacilli. Specifically, the latter authors[10] showed that 2.0 per cent dibasic ammonium phosphate plus 1.2 per cent urea is inhibitory for lactobacilli, but they demonstrated also that the ammonium salt can be replaced by the sodium salt without decreasing the effect. They showed further that 1.2 per cent urea stimulates lactate production during the very time that the ammonia content of incubated saliva-glucose mixtures rises to a high point of 400 mg. per 100 ml. They[10] concluded from their experiments that dibasic ammonium phosphate prevents urease activity and that the ammonium ion is not needed for the inhibition of oral lactobacilli. Pearlman[9] obtained similar findings. Mitchell, Helman and Chernausek[11] in an experiment on hamsters demonstrated that when used in the drinking water with urea the sodium ion is as effective as the ammonium ion in reducing dental decay.

The dentifrice tested in this study conducted at the Eastman Dental Dispensary was a powder containing 12 per cent urea (carbamide) and 1 per cent urease together with polishing and flavoring agents. The urea content of this dentifrice is sufficiently great to satisfy the supposed inhibitory levels either as urea or as ammonium ions. Theoretically, the urea-urease combination in this dentifrice should provide a slow continual release of ammonium ions through the decomposition of urea to ammonium carbonate as described by Van Slyke and Archibald,[12] and Van Slyke and Cullen.[13] The addition of urease to the formula is reasonable in view of the report of Hine and O'Donnell[14] that whereas 92.8 per cent of 405 saliva samples from 82 subjects showed urease activity, the activity varied greatly from day to day and was not present consistently in the mouths of caries-susceptible persons.

DESCRIPTION OF STUDY

In evaluating the carbamide-urease dentifrice under consideration, both bacteriological and clinical tests were used.

Bacteriological Study • In the bacteriological study, preliminary lactobacillus counts of the saliva of 15 dental hygiene students were taken according to Jay and Arnold's[15] modification of Hadley's method. These counts revealed that there

7. Henschel, C. J., and Lieber, Leon. Caries incidence reduction by unsupervised use of 27.5 per cent ammonium therapy dentifrice. J. D. Res. 28:248 June 1949.

8. Henschel, C. J., and Lieber, Leon. High-urea ammoniated dentifrice: caries reduction through four years' home use. Oral Surg., Oral Med. & Oral Path. 5:155 Feb. 1952.

9. Pearlman, Sholom. Influence of ammonia and of urea upon L. acidophilus 4646. II. Studies on anaerobic glycolysis. J. D. Res. 30:656 Oct. 1951.

10. Jenkins, G. N., and Wright, D. E. Role of salivary ammonia in dental caries. Brit. D. J. 89:261 Dec. 19, 1950; 90:117 March 6, 1951.

11. Mitchell, David F.; Helman, Edith Z., and Chernausek, Dwight S. Ammoniated dentifrices and hamster caries: further studies on the effects of ingestion. Science 116:537 Nov. 14, 1952.

12. Van Slyke, D. D., and Archibald, R. M. Manometric, tetrimetric, colorimetric methods for measurement of urease activity. J. Biol. Chem. 154:623 Aug. 1944.

13. Van Slyke, D. D., and Cullen, G. E. Mode of action of urease and of enzymes in general. J. Biol. Chem. 19:141, 1914.

14. Hine, M. K., and O'Donnell, J. F. Incidence of urease producing bacteria in saliva. J. D. Res. 22:103 April 1943.

15. Jay, Philip, and Arnold, Jr., F. A. Epidemiological aspects of oral lactobacillus counts in fluoride and non-fluoride areas. In Dental caries and fluorine, Moulton, Forest R., editor, Lancaster, Pa., Science Press Printing Co., 1946, p. 43.

Table 1 • Comparison of averages of lactobacillus counts (thousands of lactobacilli per milliliter of saliva)

		Week							
		1	2	3	4	5	6	7	8
Group 1	Subject								
	1	38	161	25	125	0	0	0	0
	2	0	0	0	1	0	0	0	0
	3	17	87	83	10	16	17	24	18
	4	203	340	199	256	189	238	248	188
	5	10	1	18	50	43	32	29	116
Group 2	Subject								
	6	0	63	2	3	0	0	0	0
	7	12	90	32	80	48	15	44	12
	8	21	83	79	26	14	19	29	29
	9	3	110	96	36	125	81	19	17
	10	27	179	121	153	147	72	63	118
Group 3	Subject								
	11	288	270	375	394	350	130	201	...
	12	0	188	38	238	0	3	0	0
	13	1	21	125	125	3	5	22	13
	14	26	162	63	32	81	15	146	47
	15	5	7	25	135	190	20	9	18

was considerable variation from day to day as well as at different times during a single day. Seventy-five students were selected to participate in an eight-week test of the effect of the dentifrice on the number of lactobacilli in saliva. The students were divided into three comparable groups on the basis of caries experience revealed by clinical examinations and roentgenograms. Group 1 students used the test dentifrice after breakfast and before retiring; and students of Groups 2 and 3 used standard brand cosmetic dentifrices similarly, except that the students of Group 3 omitted brushing on the evening before and also during the test days. Four samples were collected on one day of each week. They were taken immediately on arising, after breakfast and toothbrushing (Groups 1 and 2 only), at 11:00 A.M. and finally at 3:00 P.M.

Because of the wide variation in the lactobacillus counts, the four counts for each day were averaged and compared. Table 1 presents data obtained from five subjects typical of each group. It can readily be seen that there is no effect on the lactobacillus counts attributable to the test dentifrice over the eight-week period.

The averages of two pretest and two posttest lactobacillus counts of 61 school children, aged 7 to 13, who had used the test dentifrice for one year revealed no significant changes as compared with the averages of a similar group of 41 children who had used a control dentifrice without urea or urease. Table 2 lists for each group the number of children whose lactobacillus counts at the beginning and end of the test year were higher or lower than 10,000 organisms per milliliter, a number arbitrarily chosen as the dividing point between low and high counts. All figures were rounded off to the nearest 1,000.

When the average lactobacillus counts of the 75 young women students participating in the eight-week test were tabulated in a similar way, there was a consistent division between the groups with counts above or below ten to twenty thousand lactobacilli per milliliter. Table 3 shows this division in terms of percentages before and after the eight-week test period. These data also indicate failure of the test dentifrice to alter significantly

Table 2 • Average lactobacillus counts for school children before and after 8 months' use of carbamide-urease dentifrice

	Control group		Test group	
	Before	After	Before	After
Less than 10,000	28	26	44	38
More than 10,000	13	15	17	23
Per cent below 10,000	31.7	36.6	27.9	37.7

the number of lactobacilli in the test group.

Clinical Study • The clinical trial of the carbamide-urease dentifrice was carried out over a period of one year among 372 school children between the ages of 7 and 13 years. All the children were first examined clinically and with bitewing roentgenograms, and the data were entered on standard dental charts.

In order to prevent exchange of dentifrices and to facilitate the supervision of the toothbrushing, which was necessary throughout the test period, all children in each classroom used only the test or control dentifrice. Consequently there was a slight disparity in the total numbers using each dentifrice. Table 4 lists according to age the number of boys and girls in the two groups.

At the beginning of the study, the children were instructed in an accepted toothbrushing technic by a dental hygiene teacher, who provided continuous, on-the-spot supervision of the project. By the employment of older children as class leaders for the daily brushing routine of their own and younger age groups, a high level of student interest was maintained. Periodic evaluations of oral hygiene showed that the routine gave results which were considerably better than those observed before the study started.

Toothbrushing was carried out under supervision at the beginning of each school day and independently in the home during the evening. Generous supplies of dentifrices and brushes were issued to each child for use at home and during holiday periods. Special arrangements were made to keep in contact with the children during the summer vacation period; and although there was no certain way of determining how closely instructions on home care were followed, the number of empty containers returned and the amount of supplies requested for home use indicated excellent cooperation.

At the end of the test periods, which ranged from 12 to 15 months for the various pairs of classes, the children were re-examined in a second series of roentgenograms; and the data were tabulated and compared with the initial findings. Because the children were in the period of mixed dentition and experiencing constant loss of deciduous teeth and eruption of permanent teeth, the data presented in the following tables are based only on those teeth actually in the mouth at both examinations. The initial caries scores for all teeth extracted or exfoliated before the final examination as well as the scores for teeth erupting during the year were deducted from initial or final scores in each case. Tables 5 and 6 list the data so obtained. It is evident from the data presented in Tables 5 and 6 that the test of the urea dentifrice in the manner described did not show an appreciable reduction in the caries incidence in teeth present for the entire trial period.

During the test period 599 teeth erupted in 155 children of the slightly

Table 3 • Distribution of lactobacillus counts of 75 young women before and after 8-week test period

Thousands of lactobacilli (averaged)	Group 1		Group 2		Group 3	
	Before %	After %	Before %	After %	Before %	After %
0- 9	32	64	28	52	12	44
10- 19	24	20	28	8	16	16
20- 29	24	0	20	4	12	0
30- 49	12	0	12	16	28	16
50-100	0	12	12	12	28	24
Over 100	8	4	0	8	4	4

*Group 1 used carbamide-urease dentifrice. Groups 2 and 3 are controls.

Table 4 • Numbers and ages of boys and girls in clinical trial of dentifrice

Age	Control group (177)		Test group (196)	
	Boys	Girls	Boys	Girls
7	3	3	4	5
8	10	10	14	23
9	19	20	7	10
10	17	18	16	24
11	13	10	29	18
12	20	10	18	13
13	12	12	6	9
Average age	10.80	10.42	10.40	10.22
Group average	10.62		10.30	

younger group (average 3.86), whereas in the 141 children of the control group 450 teeth erupted (average 3.19). Calculation of the caries attack rate of these new teeth is listed in Table 7. It is evident that the annual caries rate for newly erupted teeth was actually slightly higher in the test group than in the control group.

DISCUSSION

If the use of urea in a dentifrice is effective in reducing dental decay, the 12 per cent urea and urease dentifrice used in this study should have resulted in a reduction either in the lactobacillus counts or in the amount of caries observed at the clinic.

Theoretically, this dentifrice should be effective not only because it has a relatively high urea content but also because the presence of the enzyme should make the urea effective as an ammonium ion source in certain mouths where urease-producing organisms are infrequent. The negative clinical observations and laboratory findings of this study, the negative clinical observations of Davies and King,[16] the laboratory studies of Pearlman[9] and of Jenkins and Wright[10] offer adequate grounds for questioning the soundness of the concept that the ammonium ion dentifrices have any value in the prevention of dental decay. As far as the laboratory evidence is concerned, recent work[9, 10] has established the following facts: the ammonium ion has no greater effect in reducing acid formation in saliva or caries in hamsters[11] than other cations; there is no direct relationship between caries activity and the ammonia content of the saliva;[4] ammonium ions

16. Davies, G. N., and King, R. M. Effectiveness of an ammonium ion toothpowder in the control of dental caries. J. D. Res. 30:645 Oct. 1951.

Table 5 • Caries incidence among school children using carbamide-urease dentifrice for one year

	Caries score				Average increase		
	Control group (176)		Test group (196)		Control group	Test group	Per cent of difference
	Exam. 1	Exam. 2	Exam. 1	Exam. 2			
*Deciduous teeth decayed and filled	324	396	451	534	0.86	0.73	−15.12
Permanent teeth decayed and filled	1,073	1,609	1,110	1,746	3.05	3.25	+ 6.56
Total teeth decayed and filled	1,397	2,005	1,555	2,270	3.45	3.58	+ 3.77
Deciduous surfaces decayed and filled	621	840	846	1,150	2.61	2.81	+ 7.66
Permanent surfaces decayed and filled	1,896	3,262	1,953	3,478	7.76	7.78	+ 0.26
Total surfaces decayed and filled	2,517	4,102	2,799	4,628	9.01	9.33	+ 3.55

*84 control and 108 test children had deciduous teeth at both examinations.

Table 6 • Caries incidence per hundred teeth

	Control group	Test group	Per cent of difference
Deciduous teeth decayed and filled	11.74	10.12	−13.80
Permanent teeth decayed and filled	16.56	18.56	+12.08
Total teeth decayed and filled	15.82	17.00	+ 7.45

favor rather than hinder the growth of lactobacilli under acidic conditions;[17] although by virtue of its alkaline reaction ammonia makes plaques temporarily more alkaline, the "ammoniated dentifrices" do not affect actual acid formation in plaques.[18]

On the clinical side, the evidence at best is confused. Although claims of caries reduction following the use of ammoniated dentifrices have been made, none of the evidence is convincing. For instance, the Henschel and Lieber[7] study, in which a high urea dentifrice was used, has little value because (1) there was no uniformity in examination procedures, (2) the results were inconclusive because of concurrent dental treatment and (3) the caries activity in the groups studied is out of line with known caries incidence in New York City, where the study was made. Actually, the figures even for the groups using the ammoniated dentifrice in the Henschel and Lieber study are well above those found by Hollander and Dunning[19] in much larger groups of New York adults. Furthermore, the Henschel and Lieber figures for caries activity in children are not in keeping with their own figures for adults; and unless the caries incidence figures (DMF calculations) are based on recurrent or secondary caries around fillings, they are incompatible with the number of caries-susceptible surfaces or teeth remaining in the mouths of patients who have been subject to such a high caries attack prior to the fourth decade of life. These criticisms apply also to the later paper of Henschel and Lieber,[8] which records their observations of patients seen in dental practice in an additional period of one year.

The findings in the other clinical studies which are quoted to support the effectiveness of the "high urea" dentifrice are also open to serious question. The difference in the amount of new caries noted in the Gale[20] study represents nothing but an equalization of caries in groups with different caries experience at the beginning of the experiment. Such a result could be expected without the use of any therapy. The variation in caries activity in six-month periods reported by Lefkowitz and Vente[21] can well be the result of the same factor or may be due merely to the usual variations in caries activity in children during the adolescent years. The increase in caries observed in the users of the ammoniated dentifrice during one of the six-month periods may be regarded as giving support to this interpretation. In

17. Rogosa, M. Personal communication, 1952

18. Little, Marguerite F.; Brudevold, Finn, and Taylor, Richard. The effect of ammoniated dentifrices on the pH and acid producing capacity of dental plaques. (Abst.) J. D. Res. 30:495 Aug. 1951.

19. Hollander, Franklin, and Dunning, J. M. A study by age and sex of the incidence of dental caries in over 12,000 persons. J. D. Res. 18:43 Feb. 1939.

20. Gale, J. A. Controlled experiment on pre-school children with an ammoniated dentifrice. D. Record 71:15 Jan. 1951.

21. Lefkowitz, William, and Vente, V. A. Preliminary clinical report on caries control with a high urea ammoniated dentifrice. Oral Surg., Oral Med. & Oral Path. 4:1596 Dec. 1951.

Table 7 • Caries incidence in teeth erupted during trial year

	No. teeth erupted	Teeth decayed and filled		Surfaces decayed and filled	
		No.	Avg.	No.	Avg.
Control group (141)	450	75	.532	92	.652
Test group (155)	599	121	.777	145	.935

short there is no satisfactory evidence—notwithstanding the advertising claims—that a dentifrice with a high urea content reduces dental decay.

Two acceptable studies, that of Davies and King[16] and this study, have failed to show any evidence of caries reduction through the use either of a dentifrice containing 3 per cent urea and 5 per cent dibasic ammonium phosphate or one containing 12 per cent urea, a concentration of urea close to the maximum found in any commercial tooth paste. The clinical study of Kerr and Kesel[22] showed a slight caries reduction after use of a dentifrice containing 3 per cent urea and 5 per cent dibasic ammonium phosphate. It was a carefully controlled experiment, but the percentage of caries reduction achieved was small enough to have occurred by chance. An indication of this possibility is the greater reduction observed in one of the control groups. In short, the failure to find any caries reduction in this study is in keeping with theoretical considerations and is not surprising in view of the vagueness of the results of other clinical tests using ammoniated dentifrices. This failure adds a further reason for viewing the ammonium ion concept of caries prevention with increased misgiving.

SUMMARY

To indicate the effectiveness of a powder dentifrice containing 12 per cent urea (carbamide) and a urease, a one-year bacteriological and clinical study was carried out with school children. This study was supplemented with an eight-week bacteriological study of dental caries in young women.

No evidence was found that the use of the urea dentifrice affected the number of lactobacilli in the saliva to a greater extent than did the use of cosmetic dentifrices.

In the clinical study, brushing twice daily with the urea dentifrice failed to produce any reduction in the occurrence of new caries in 196 children as compared with that in 177 children using a control dentifrice containing no urea or urease.

The validity of claims of caries reduction by ammonium ion dentifrices is questionable.

22. Kerr, D. W., and Kesel, R. G. Two-year caries control study utilizing oral hygiene and an ammoniated dentifrice. J.A.D.A. 42:180 Feb. 1951.

Dreamers • Those who dream by day are cognizant of many things which escape those who dream only by night. *Edgar Allan Poe, Eleonora.*

Untested alternatives to fluoridation of domestic water supplies

Sholom Pearlman, D.D.S., M.S., Chicago

Occasionally a well-intentioned scientist proposes an alternative to water fluoridation with the purpose of providing a better method of using fluorine in the control of dental caries. The author of a recent article,[1,2] however, is apparently unfamiliar with much of the voluminous data that support the fluoridation program.

The author[1] infers that water fluoridation is wasteful, technically complex, uncertain and irregular in its effect and in violation of the concepts of religious freedom, and suggests that all these features might be avoided if fluoride were added to milk instead of to water.

The first fallacy in this approach is in the unwarranted assumption that the use of fluoridated milk will necessarily result in a reduction in the incidence of dental caries. There is no direct factual evidence to support such an assumption. Any modification of the current method of providing dietary fluoride must be studied thoroughly before it is effectuated. No such study has been made in the case of the present suggestion. In fact, the author himself declares that "further thinking and research" are indicated.[1]

The principle of water fluoridation does not necessarily hinge on the ingestion of a definite quantity, for example, 1 mg., of fluoride per day but rather derives from the observation that the presence of one or more parts per million of fluoride ion in domestic water is associated with substantially reduced caries rates.[3] Such water is used in locally manufactured beverages as well as in cooking and for drinking *per se*. Fluoride is thus consumed throughout each day by every child living in the community. If fluoride were available only in dairy milk, many infants would receive little or none in the first weeks of life, growing children would obtain it to varying degrees depending on their individual liking for milk, and older children, whose dietary habits are frequently improper, would receive an indeterminate quantity of fluoride at a time when their teeth are still undergoing active formation. It should be added that many children consume relatively large quantities of milk.

There would be the additional problem of deciding on the actual amount of fluoride that would have to be added to milk to ensure an intake of fluoride that might produce effective results in controlling caries. The intake of water, though it may be somewhat irregular, is less variable than other items in human nutrition. Nuckolls has pointed out also that the average individual does not con-

Assistant secretary, Council on Dental Therapeutics, American Dental Association.

1. McKee, Jack E. Fluorides. Engin. & Sc. 15:18 April 1952.

2. Editorial. Scient. Am. 187:38 Oct. 1952.

3. Dean, H. T. Fluorine: water-borne fluorides and dental health. In Dentistry in public health, Pelton, W. J., and Wisan, J. M. Philadelphia, W. B. Saunders Co., 1949, p. 136-162.

sume water beyond the normal metabolic requirement and that excessive amounts of fluoride are not likely to be ingested when the mineral is provided through this medium.[4]

Evidence is still required to demonstrate that fluoride may not be rendered partially unavailable for physiologic utilization when it is added to milk. To measure the dental benefit of milk-borne fluoride would require intensive investigation for a number of years in large population groups at great expense. Such a project, though worth-while, appears unnecessary in view of the effectiveness and simplicity of the water fluoridation programs now available.

In communities where fluoride is added to the water supply, the material is introduced into the mains by a constant-feed device whose output is regulated automatically by the actual flow of water into the distribution system. Devices of this type are reliable and require a minimum of attention. The final solution is so dilute that even in the unlikely event that a large excess of fluoride may accidentally be introduced during the feeding procedure, there is no danger of producing toxic concentrations. In a dairy, however, the chemicals would frequently have to be added to individual vats of milk; and rigorous vigilance would be necessary to ensure that the concentrations would remain constant from batch to batch. This surveillance would entail careful testing by trained personnel, and even with such supervision the possibility of an accident would be comparatively great. The chemical determination of fluoride in milk is much more difficult and involved than the determination of fluoride in water.

There are more than twelve million people in various areas of the United States who are already using water supplies containing optimal or more than optimal amounts of fluoride.[5] If fluoridated milk were used, it would be necessary, in order to avoid the possibility of producing mottled enamel, to ensure that the fluoridated milk would not find its way into those areas.

The limited supply of suitable fluoride salts is cited in the article[1] as an important reason for using milk as a vehicle since lesser amounts of these compounds would be required. Reliable sources indicate, however, that the available supplies are more than adequate for present needs.[6] As a result of the increasing demand for these substances, manufacturers are now actively producing more fluorides from hitherto neglected sources with little additional effort and at low cost. There is no reason to doubt that adequate supplies of fluorides will be available to all communities requiring them in the foreseeable future.

The addition of fluoride to water is an inexpensive procedure in most communities. McKee in his article[1] cites the extraordinary example of San Bernardino, whose water supply originates in 17 different sources. Estimates are presented which indicate that the annual cost of the necessary initial equipment, amortized over 20 years, would be about 20 cents per capita, in contrast to the average figure of 8.8 cents derived from actual cost data in 140 areas where the program has been instituted.[5] Even if the additional costs for servicing and for chemicals were to raise the estimate for San Bernardino to 30 cents per capita per year for the first 20 years, the savings that would eventually accrue from reduced dental needs far outweigh this unusually high estimate of cost for that city. In consideration of the low price of chemicals and the limited technical attention required for continued operation,

4. Item in News Letter, Council on Dental Health, American Dental Association June 9, 1952, p. 3.

5. Phair, W. P., and Driscoll, M. F. The status of fluoridation programs in the United States, its territories and possessions. J.A.D.A. 45:555 Nov. 1952.

6. A.W.W.A. task group E5-10: committee on fluoridation, materials and methods. Natural and applied fluoridation census: supplemental report. J.A.W.W.A. 44:943 Oct. 1952.

fluoridation of the water supply is actually the least expensive and most convenient method known for caries control. If fluoridated milk were made available at even a fourth of a cent per quart above the regular price (a low estimate for the cost of chemicals, chemical control procedures, advertising, labeling and distribution), the annual cost per consumer, on the basis of one quart per day, would be about 90 cents, that is, 90 cents extra expense for ingesting fluorine in milk instead of in water notwithstanding the fact that the effectiveness of the milk in preventing caries and in reducing dental expense is still not established.

The questions of religious freedom and freedom of choice have been answered in detail elsewhere.[7] It may be pointed out in addition that it would be a travesty of the democratic principle of free choice if a minority of misguided but militant partisans were to be permitted to prevent the majority of the population from choosing to obtain relief from dental disease by the simplest, cheapest and most effective method available.

Experiment and investigation may, after many years, reveal whether or not fluoridated milk may be useful in the control of dental caries. At the present time it does not appear promising. Until an accumulation of scientific data indicates the usefulness of other procedures, the current method utilizing fluoridation of domestic water supplies offers the only established means of reducing the incidence of dental caries on a popular basis.[8] Untested alternatives, such as the use of fluoridated tablets, table salt, chewing gum, dentifrices, mouthwashes, bottled water or milk, should not be advocated, since the true issue tends to become clouded in the resulting confusion.

7. American Dental Association, Council on Dental Health. Fluoridation facts: answers to criticisms of fluoridation. Chicago, American Dental Association, 1952, p. 8.

8. American Dental Association, Council on Dental Therapeutics. Current status of dental uses of fluorides. J.A.D.A. 45:468 Oct. 1952.

Good Books • Good books are to the young mind what the warming sun and the refreshing rain of spring are to the seeds which have lain dormant in the frosts of winter. They are more, for they may save from that which is worse than death, as well as bless with that which is better than life. ***Horace Mann.***

Preparations of stannous fluoride compared with sodium fluoride for the prevention of dental caries in the rat

Joseph C. Muhler, D.D.S., Ph.D.; William H. Nebergall, Ph.D., and Harry G. Day, Sc.D., Bloomington, Ind.

In research on compounds of fluorine in connection with enamel solubility,[1,2] it was noted that commercial preparations of stannous fluoride differed considerably in composition, physical properties and effect on enamel solubility. Likewise it was observed that preparations of stannous fluoride made in the Indiana University laboratories from time to time during the past six years tended to show variations. Stannous fluoride has already been demonstrated to be superior to sodium fluoride in preventing experimental dental caries in the rat.[3,4] Attention now should be given to the reasons for such superiority since in former experiments it was apparent that the chemical state of the fluorine as well as the amount are important determinants in caries prevention.

None of the commercial samples of tin fluoride labeled "stannous fluoride" which were examined in these studies yielded analytical data in satisfactory agreement with the theoretical value for stannous fluoride. The sample which seemed to be the closest to the theoretical value had 0.65 per cent excess tin; the poorest was 11.75 per cent below the theoretical value for tin. After considerable investigation of the preparation of stannous fluoride, it became possible to produce a product of uniform characteristics, which contained substantially the requisite theoretical amount of tin and whose value generally varied no more than 0.05 per cent from the theoretical value for stannous fluoride.[5]

Stannous fluoride hydrolyzes in water, and the tin is gradually precipitated as a hydroxide. Oxidation to the stannic form occurs unless rigorous precautions are taken to prevent the change. In simple aqueous solution these processes of hydrolysis and oxidation begin instantly although many hours may be required for the attainment of a state of equilibrium. Without doubt, the effectiveness of tin fluoride in the protection of the teeth against dental caries is influenced by the state of oxidation of the tin as well as by the nature and concentration of the various ions and complexes which may

From the department of chemistry, Indiana University.

1. Muhler, J. C., and Van Huysen, Grant. Solubility of enamel protected by sodium fluoride and other compounds. J. D. Res. 26:119 (April) 1947.

2. Muhler, J. C.; Boyd, T. M., and Van Huysen, Grant. Effect of fluorides and other compounds on the solubility of enamel, dentin and tricalcium phosphate in dilute acids. J. D. Res. 29:182 (April) 1950.

3. Muhler, J. C., and Day, H. G. Effects of stannous fluoride, stannous chloride and sodium fluoride on the incidence of dental lesions in rats fed a caries-producing diet. J.A.D.A. 41:528 (Nov.) 1950.

4. Muhler, J. C., and Day, H. G. Effect of stannous fluoride in food and drinking water on caries prevention in rats on high sucrose and coarse corn diets. J. Nutrition 44:413 (July) 1951.

5. Nebergall, William; Muhler, J. C., and Day, H. G. The preparation and properties of stannous fluoride. J. Am. Chem. Soc. 74:1604 (March) 1952.

exist in an aqueous solution. Consequently, one objective of this investigation was the comparison of the caries-preventive action of authentic stannous fluoride freshly dissolved in drinking water and protected from oxidation with the action of similar stannous fluoride which had been allowed to undergo extensive hydrolysis and oxidation. Another objective was to compare such tin fluoride of known composition with a commercial preparation known to be somewhat impure and relatively insoluble. In addition, it was believed that some understanding of the caries-preventive action of fluorine could result from studies on the effect of stannous tin administered with sodium fluoride. If fluorine in such a mixture should not protect the teeth as much as stoichiometric amounts supplied as stannous fluoride, it would indicate that the protective action is dependent on something besides the concentration of the ions of tin and fluorine in the environment of the teeth.

Another problem for which an answer was sought was the degree to which fluorine from these different sources might be deposited in the body. All consideration of the utility of fluorine in any form for the protection of the teeth ought to include consideration of its effect on other organs and structures. This effect is particularly important in cases involving frequent ingestion of the fluorine over long periods of time. Consequently it was desired to determine the concentration of fluorine in the bones after repeated ingestion of different compounds of fluorine.

EXPERIMENTS

The general care and selection of the experimental animals were similar to the care and selection employed in some previous studies.[3,4] Weanling rats from a single source were used. Throughout the experiment they were fed a slightly modified Hopper, Webber and Canniff diet which contained 0.36 mg. per cent fluorine.

The rats were divided into six groups with both sexes in all groups except one which was made up exclusively of males. The supplements were placed in the tap-distilled drinking water[6] at a calculated concentration of 10 ppm fluorine, except that an effort was made to keep the concentration of fluorine in the stannous fluoride preparations slightly below that level; the purpose was to avoid any danger of supplying the animals to which these supplements were given with more fluorine than was given to the others. At weekly intervals the concentration of fluorine in all the supplements was determined by chemical analysis.[4] The variation from the calculated levels was always slight. The supplements and the concentrations of fluorine in each are given in the accompanying table.

Fresh stannous fluoride supplements were made up each day from a stock solution containing approximately 1,000 ppm fluorine. The reaction of this stock solution was kept between pH 1 and 2 by the addition of hydrochloric acid, which inhibited hydrolysis and kept the solution clear. Oxidation of the stock solution was prevented by keeping it covered with a thick layer of mineral oil. Any solution remaining in the animals' drinking bottles from the previous day was discarded, and freshly prepared stannous fluoride was added. Freshly boiled distilled water was used to make up all the solutions. Aged supplements were made up from the same stock solution, but they were allowed to stand approximately two weeks without protection from oxidation before they were given to the animals.

In all cases the supplements and the diet were administered concurrently and without interruption throughout the 140 days of the experiment. After the rats

6. Distilled water furnished from tap.

Table • Effect of different compounds of fluorine on the teeth and on the deposition of fluorine in the bones.*

Supplement	pH of water	Sex	No. of rats	Carious lesions		% decrease in number	Analysis of femurs[1]		
				Extent	Number		Ash wt	Ash	F in ash
							Gm.	%	μg/Gm.
SnF_2[2] (F-9ppm)	2.6	M	20	1.20	2.9 ± 0.29[3]	58	0.3190	51.2	1,210
Fresh		F	11	1.35	3.3 ± 0.48	55	0.2380	52.0	1,420
SnF_2[2] (F-9ppm)	2.9	M	22	1.45	4.0 ± 0.43	42	0.3310	53.0	1,150
Aged		F	12	1.51	4.4 ± 0.50	40			
SnF_2[4] (F-10ppm)	3.6	M	20	1.42	4.7 ± 0.65	32	0.3750	51.9	1,060
Aged									
NaF (F-10ppm)	5.1	M	14	1.61	5.2 ± 0.70	25	0.3215	53.6	1,810
		F	14	1.78	5.7 ± 0.63	22	0.2830	54.0	2,000
NaF (F-10ppm) + $SnCl_2$ (Sn-31ppm)	3.5	M	18	1.70	5.5 ± 0.83	20	0.4425	53.3	1,275
Aged		F	15	1.50	5.2 ± 0.79	29	0.2485	55.0	1,443
None (F-0.15ppm)	5.5	M	24	2.00	6.9 ± 0.99	0	0.3120	48.5	248
		F	14	2.13	7.3 ± 0.85	0	0.2140	55.0	336

*The total amount of fluorine is not indicated, but it can be calculated readily from the data given in the table.
1. Each value is the average of the analyses of femurs from each of six rats.
2. Prepared at Indiana University.
3. Standard deviation.
4. Secured from A. D. McKay Co., New York, N. Y.

were killed by ether inhalation, the heads and both hind legs were removed for analysis. The method used to prepare the heads and to examine the teeth was substantially the same as that described in a previous paper.[3]

The number of carious lesions per rat was determined by the method reported earlier.[3,4] In addition to this designation of the caries status, the extent or size of the various lesions was evaluated arbitrarily. For this purpose three different categories were recognized. These were recorded as numbers 1, 2 or 3. A no. 1 classification was used for a very small cavity which did not penetrate the enamel; or if the lesion was on an exposed occlusal dentin surface, this classification was used only for superficial lesions. The use of the no. 2 designation was reserved for lesions which definitely extended into the dentin through the apex of the enamel-covered fissure and involved a relatively large area but without extending beyond its own fissure or cusp. A no. 3 classification was used when the carious process had entirely destroyed its cusp or fissure and pulpal involvement was apparent. The extent index for each animal was computed by determining the sum of the extent numbers and then taking the mean of those values. The mean value constituted the extent index for the animal.

The femurs to be analyzed for fluorine were dissected free from soft tissue, care being exercised to avoid contamination with sources of fluorine. Each femur was dried over fresh calcium chloride for 4 days and then ashed in a clean muffle furnace at 550° C. for 7 to 8 hours. A uniform portion of each shaft was weighed and transferred directly to an all-glass distillation vessel. The remainder of the analytical procedure was the same as the one described previously.[4] In all cases femurs from the right leg were used.

RESULTS

None of the compounds had any effect on the growth rate or general appearance of the animals. The effects on the teeth and the uptake of fluorine by bones are summarized in the table. It is shown that the method of preparing the stannous fluoride is important in determining its protectiveness. The aged compound obtained from a commercial source decreased the average number of carious lesions to 4.7, whereas the aged compound synthesized in the laboratory decreased the number to 4.0 even though the average concentration of the latter compound in the drinking water was by intent slightly less than the concentration of the commercial compound. There was no difference between the preparations with regard to the extent of the carious lesions which formed. The commercial compound used for this experiment appeared to be less effective than another commercial product, as judged by a comparison with data published earlier.[3] Although the commercial stannous fluoride was much less soluble in water, it was possible to secure substantially water-clear solutions of it initially in the concentrations desired.

The results showed also that stannous fluoride, whether fresh or aged, protects the teeth more effectively than sodium fluoride. Males receiving the fresh stannous fluoride had an average of only 2.9 lesions per rat, whereas those receiving the aged preparation had 4.0. Lesions in the teeth of females showed the same degree of difference. Moreover, the extent of the carious lesions was definitely less in the teeth of the animals given the fresh stannous fluoride. Thus, it may be concluded that the effect which aging has on the effectiveness of stannous fluoride solutions has significant implications in relation to prophylactic uses of this compound and that care should be exercised to protect the substance from degradation prior to its use.

Apparently, the hydrolysis of stannous fluoride does not continue to completion; instead, after several hours a state of equilibrium may be attained. Simultaneously, oxidation may occur. It appears that the products of hydrolysis include hydrofluoric acid and stannous hydroxide, the latter of which is only slightly soluble. The removal of stannous ions from solution as insoluble stannous hydroxide and the formation of hydrofluoric acid, which is but slightly dissociated into hydrogen and fluoride ions, may account in part for the decreased effectiveness of aged stannous fluoride. In addition, exposure of stannous fluoride solutions to air permits oxidation to the slightly soluble stannic oxyfluoride. By oxidation both tin and fluorine are removed from solution. This action may be a factor in the decreased effectiveness of the aged supplement.

As shown in the table, sodium fluoride mixed with stannous chloride has about the same protective action as sodium fluoride alone. In this instance the concentration of fluorine and tin in the drinking water was slightly higher than in the drinking water prepared with the best quality stannous fluoride. Even so, the rats which were given stannous fluoride had fewer carious lesions; and the severity of the lesions which did occur was less than in the rats which were given the sodium fluoride-stannous chloride supplement. This fact suggests that the unusual protectiveness of stannous fluoride is due to the presence of some form of tin and fluorine other than stannous and fluoride ions. If this were not the case, a mixture of sodium fluoride and stannous chloride should be just as effective as stannous fluoride. This statement is in agreement with the findings of Ericsson,[7] who showed that a mixture of sodium fluoride and stannous chloride is

7. Ericsson, Yngve. Reduction of the solubility of enamel surfaces. Acta Odont. Scandinav. 8:60 (March) 1950.

decidedly less effective than stannous fluoride in decreasing the solubility of whole tooth sections in dilute hydrochloric acid. It does not seem likely that the superiority of stannous fluoride is due to the presence of some unidentified contaminant. If this were the case, the aged stannous fluoride should be as protective as the fresh preparation, that is, unless the treatment inactivated such a contaminant. Moreover, the less pure commercial preparation was not as protective as the highly purified compound made in the laboratory.

In general, the data on the deposition of fluorine in the bones as well as the data on the bone ash weight are of interest. In no case did any of the supplements appear to affect the degree of bone mineralization; however, large differences were found in the amount of fluorine deposited. All the rats which were given the different stannous fluoride preparations had approximately the same concentration of fluorine in the bones, but the level was no more than two thirds as much as that in the rats which were given sodium fluoride. The rats which were given stannous chloride with the sodium fluoride had substantially the same amount of fluorine in the femurs as those receiving stannous fluoride. These differences in the amount of fluorine found in the bones could be due to differences in the amount of water consumed, which, in turn, would affect the amount of fluorine ingested. Gross observations of water consumption, however, revealed no evidence in support of this hypothesis. Until the basis for the superior caries-preventive action of stannous fluoride is clarified, it appears improbable that these unexpected data on fluorine deposition in the bones can be explained. It would seem that compounds which result in the greatest accumulation of fluorine in the bones ought to exhibit the greatest caries-preventive action. This result was implied in the report by McClure.[8] The data presented in this study, however, not only do not support such a theory but suggest the invalidity of such an assumption.

Most of the supplements which had the greatest caries-preventive effect also had the lowest pH as shown in the table. This result, however, may be only coincidental. The pH of the supplement containing sodium fluoride and stannous chloride was in the pH range of the different preparations containing stannous fluoride, but the former fluoride was decidedly less effective in promoting good dental health. That the pH of protective agents affecting enamel solubility may be of minor importance is suggested by improved *in vitro* tests.[9] Clinical investigations with acidulated sodium fluoride[10] support this conclusion. Some enamel erosion occurred in approximately one third of the rats receiving the stannous fluoride prepared fresh each day. These animals tended to have fewer cavities than other rats receiving the same supplements, and the severity of their lesions was not as great.

SUMMARY

The effectiveness of different compounds of fluorine in the prevention of experimental dental caries was tested on rats. All the compounds were administered in the drinking water, and the fluorine concentration was maintained at 9 or 10 ppm in all cases. The definite protective effect of stannous fluoride was again demonstrated, but it was shown that freshly prepared solutions are more effective than those which are several days old. Furthermore, preparations of stannous fluoride may vary considerably in effectiveness. Some intrinsic property of

8. McClure, F. J. Availability of fluorine in sodium fluoride vs. sodium fluosilicate. Pub. Health Rep. 65:1175 (Sept. 15) 1950.

9. Muhler, J. C., and Day, H. G. Relation of pH to the effectiveness of sodium fluoride and stannous fluoride in decreasing enamel solubility. J. D. Res. 31:102 (Feb.) 1952.

10. Roberts, J. F.; Bibby, B. G., and Wellock, W. D. Effect of an acidulated fluoride mouthwash on dental caries. J. D. Res. 27:497 (Aug.) 1948.

the stannous fluoride appears to account for its superiority since stoichiometric amounts of fluorine and tin supplied as sodium fluoride and stannous chloride were no more effective than sodium fluoride alone. Significance is attached to the finding that the amount of fluorine deposited in the bones was not proportional to the degree of dental caries protection.

The first one hundred thousand dollars

John C. Brauer, D.D.S., M.Sc., Chapel Hill, N. C.

The dental profession of North Carolina, motivated by the highest ideals and possessing a strong conviction that dentistry through education and research must remain ever dynamic, has contributed and pledged to date more than $100,000 to the Dental Foundation of North Carolina, Inc. This activity in behalf of the Foundation is the beginning of a program which will expand constantly and have an increasingly significant and favorable influence on the University, its School of Dentistry, the entire profession and the public.

ORGANIZATION AND PURPOSE OF THE FOUNDATION

A group of forward-looking dentists, encouraged and directed by the late Dr. Henry O. Lineberger, recognizing the values and opportunities inherent in other foundations such as those in the textile, dairy, medical, business and agricultural fields, reached the decision that a Dental Foundation should be established. The Foundation, accordingly, was incorporated under the laws of North Carolina in November 1950.

In order to develop fully a program of solicitation, certain hurdles had to be cleared. The first was the hurdle represented by the Bureau of Internal Revenue, which now has declared the Dental Foundation a nonprofit, educational organization, a declaration which permits suitable tax exemptions for the donors. These tax exemptions have been secured on the state level also. The second hurdle accomplished was the clearance for solicitation obtained from the Department of Public Welfare. While there is no legal connection between the University and the Dental Foundation, the University administration has a vital interest in its success, since the primary purpose for the existence of the Foundation is to aid the program of the School of Dentistry and by that means to promote the dental and thereby the general health of the people of the State. The president of the consolidated University, the chancellor at Chapel Hill and certain other administrative officers of the University are members of the board of directors.

The declared purpose of the Foundation is to make available to the University of North Carolina School of Dentistry

Dean, School of Dentistry, University of North Carolina; secretary-treasurer, Dental Foundation of North Carolina, Inc.

A, front street view of School of Dentistry; B, School of Medicine; C, University Hospital; D, School of Nursing; E, interns' and residents' quarters

funds for research, fellowships, lectureships, visual education, student loans and other activities not supported by funds from state appropriations.

Fund raising is planned and carried out by the development committee, which is state-wide and includes division, district and county chairmen. This committee directed the initial October-November 1951 campaign, which resulted in the first $100,000. This committee continues to function, establishing the pattern for further development. Plans are being made for the solicitation of nondentists and for utilizing other mediums for raising funds.

PLANS FOR THE FURTHER DEVELOPMENT OF THE FOUNDATION

The following plans for the further development of the foundation have been approved by the development and the executive committees:

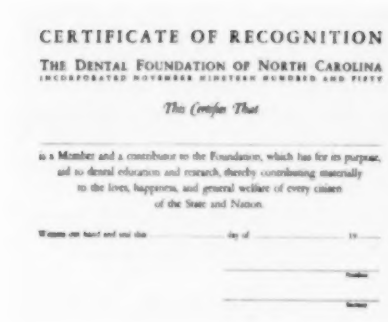
1. To present a framed Certificate of Recognition to all contributors.
2. To encourage dentists and friends of the profession to include a bequest to the Foundation in their wills.
3. To supply the clients of the American Trust Company of Charlotte and its affiliated trust companies with information concerning the aims of the Foundation and opportunities for participation.
4. To encourage dentists and friends of dentistry, not yet enrolled, to make an annual contribution.
5. To encourage the use of "In Memory Of" cards in lieu of flowers.
6. To solicit funds from selected corporations and lay persons.
7. To assist the Dental Auxiliary in the formulation of plans for securing contributions to the Dental Foundation.

Certificate of Recognition • The dignified certificate shown here is to be presented to each contributor.

Bequests to the Foundation • A number of dentists have already revised their wills to provide a bequest for the Dental Foundation. From time to time dentists have patients who may express an interest and a desire to make a similar bequest when the purpose of the Dental Foundation is known and understood.

Cooperation of the Trust Company and Its Affiliates • The fiscal agent of the Foundation, the American Trust Company of Charlotte, which has some 20 affiliated trust companies, has expressed its desire to include the Foundation in its list of worthy endeavors which it presents to its clients. Already a number of clients in the planning of their wills and estates have included a bequest to the Dental Foundation. It is obvious that in the coming years bequests may become a source of substantial funds for the Dental Foundation.

Annual Contributions from Dentists and Friends of Dentistry • A considerable number of dentists who made contributions to the initial campaign for $100,000 have expressed their intention to make annual contributions.



CERTIFICATE OF RECOGNITION

THE DENTAL FOUNDATION OF NORTH CAROLINA

INCORPORATED NOVEMBER NINETEEN HUNDRED AND FIFTY

This Certifies That

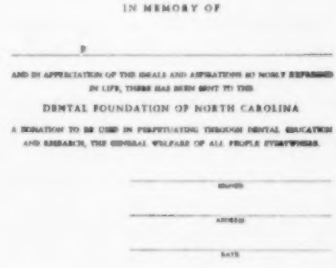
is a Member and a contributor to the Foundation, which has for its purpose, and to dental education and research, thereby contributing materially to the lives, happiness, and general welfare of every citizen of the State and Nation.

"Certificate of Recognition" to be presented to all dentists who contribute to the Dental Foundation

"In Memory Of" Cards in Lieu of Flowers • Cards with envelopes have been distributed to every registered dentist in the state with the purpose of encouraging the sending of the card in lieu of flowers to the family of the deceased. The dentist sends the card to the bereaved family, and to the secretary of the Foundation he sends a check with the name of the deceased and any pertinent information. The secretary acknowledges the receipt of the check with a letter to the family and mails a copy of this letter to the dentist.

Solicitation of Funds From Selected Corporations and Lay Persons • Although the phase of the program pertaining to the solicitation of funds from selected corporations and lay persons is in its embryo stages, it offers many possibilities. Every dentist has as patients one or more prominent persons to whom he may present the purposes and objectives of the Foundation; or if he prefers, he may call the attention of one or more members of the development committee to such an individual as a possible contributor.

Cooperation of the Dental Auxiliary • A well organized, enthusiastic State Dental Auxiliary, which is divided into districts, has as one of its major projects the further development of the Foundation. In addition to self-imposed district quotas, a number of plans are being carried out to motivate a drive for funds from various sources. The spirit, interest and favorable influence which the women of this auxiliary have had on the entire program to date have been significant factors in the success of the project. Considerable interest, team play and a fine *esprit de corps* have been shown also by the Dental Dames, an organization of the wives of students. They have presented funds from "bake sales" with the stipulation that these funds are to be used for the further development of visual aids in the School of Dentistry.



IN MEMORY OF

DENTAL FOUNDATION OF NORTH CAROLINA

"In Memory Of" card to be sent in lieu of flowers to family of deceased

SUMMARY

1. The Dental Foundation, incorporated within the laws of the State, provides a medium whereby dentists and friends of dentistry may contribute with confidence to a program of dental education and research.

2. A foundation which has as its purpose aid to dental education through research, fellowships, scholarships, student loans and other means, which is organized

in a democratic manner and receives encouragement from a university will receive substantial support.

3. A dental foundation with a sound organizational pattern will continue to grow and mature with the years. It is imperative that the officers and directors look not only to the present programs but to the future development of the Foundation for decades ahead.

4. Dental education must be dynamic. It must find ways and means through research to continue to contribute to total knowledge. If dentistry is to continue to grow in stature as a great health profession, additional support must be directed to education. The organization and development of other dental foundations, therefore, should be encouraged as an invaluable source for such support.

Evaluation of the Airdent unit: preliminary report

Arthur H. Morrison, D.D.S., and Leonard Berman,† D.D.S., New York*

In January 1951 approximately 20 dental schools initiated a postgraduate program in the airbrasive technic. Since that time hundreds of dentists have completed such courses, but much speculation still exists as to the efficacy of such a unit in dental practice. For the purpose of making a preliminary survey, questionnaires were sent to 312 dentists who had completed an airbrasive course at the New York University College of Dentistry during the period from February 1951 to July 1951. The primary purpose was to ascertain whether or not these dentists purchased the unit after taking the course. Secondary purposes of the survey were to determine what use had been made by those who had purchased the unit and how valuable the course had been to them. The questionnaire was sent six months after the completion of the last course.

RESPONSE TO THE QUESTIONNAIRE

Of the 312 questionnaires sent out, 143 were properly filled out and returned. Although this survey may not represent an adequate sampling for proper statistical evaluation, the information secured may be of interest to the profession at this time. The following is an outline of the questions, responses and significant comments:

*Associate professor and chairman, operative dentistry department, College of Dentistry, New York University.

†Assistant professor, operative dentistry, College of Dentistry, New York University.

Question 1 • Date you completed course.

Replies to this question are not pertinent to this report.

Question 2 • Have you purchased an Airdent unit?

Answer • Yes 50
No 93

Three men purchased the unit and returned it after using it for several months.

Question 3 • If the answer to question 2 is "No," state reasons.

Answer •

Reason given	Frequency
Cost of equipment	66
Limited usefulness	49
Pain associated with use	9
Lack of office space	6
Cumbersomeness of unit	6
Necessity of using bur or hand instrument after Airdent	5
Residual dust	5
Increase in operating time	5
Lack of skill	4
Necessity for using rubber dam	4
Necessity of having an assistant	3
No decision yet	2
Need for further training	2
Possibility that further improvements are forthcoming	1
Restricted usefulness for children	1
Necessity for increasing fees	1
Lack of visibility	1

In judging these reasons, it must be recognized that the only training these men had had in the use of the Airdent unit was received in a one-week course of 36 hours, 26 of which were devoted to work of a technical nature. Clinical application consisted of approximately five operations per student. Many of these operations were performed on extremely carious teeth, not the type of teeth for which the airbrasive technic is best adapted, particularly if used by operators of such limited experience.

Since some dentists gave more than one reason, the total number of reasons is greater than the total number of replies. Many of the reasons are overlapping; for example, some dentists felt that in view of the limitations in the use of the unit, the original cost of the equipment was prohibitive. All reasons with the exception of the first and the second can be considered supplementary to the first two since they were always noted in conjunction with them. This was true from the beginning. At the conclusion of every airbrasive course, which had an average of 15 men in a class, the following question was asked of the group: "Regardless of the cost of the unit, regardless of the possible lack of space in an office and based on your actual experiences after using the unit for a week, how many men would care to have such a unit in their office?" A unanimous response in the affirmative was always received.

The remaining questions concern the reactions of the men who purchased the unit and used it for varying periods up to one year.

Question 4 • If the answer to question 2 is "Yes," please answer the following questions:

For what types of cavity preparations do you use airbrasive?

Answer •

Type of preparation	Number
I	47
II	45
III	44
IV	25
V	46
P.J.	7
Crown	6

It can be seen that the unit was used chiefly for internal types of preparations.

Question 5 • What percentage of cases would you estimate that you prepare with airbrasive?

Answer •

Per cent	Number reporting
0	0
5	0
10	3
15	3
20	4
25	7
30	1
35	1
40	4
45	0
50	7
55	0
60	5
65	0
70	2
75	0
80	0
85	0
90	3
95	0
100	1

The response to this question depended on the individual's desire to use the unit and his confidence in using it. The responses show a wide variation with an average percentage between 25 and 50 per cent. The question itself may have been ambiguous since what the questioners wanted to know was the actual percentage of cavities prepared with the Airdent unit rather than the percentage of operative cases for which it was used. The scattered responses to this question, compared with the answers to questions 4 and 6, seem to indicate some misunderstanding of this question.

Question 6 • Do you have to resort to rotary instrumentation in finishing?

Answer •

Type of preparation	Number
I	28
II	41
III	30
IV	22
V	23
P.J.	7
Crown	6

The response indicates that rotary instrumentation was required to complete the cavity preparation.

Question 7 • Have you been able to use the technic for other than primary caries, such as refill of amalgam, atypical extensive caries?

Answer • Yes.....24
No.....23

About half the men used the unit for the removal of amalgam and extensive caries as well as for typical decayed teeth.

Question 8 • Do you use rubber dam for cavity preparations with airbrasive?

Answer •

Yes 36
No 10
How often .....15 to 99 per cent
Type of preparation .....Class I-V including P.J. and crowns

Question 9 • What other methods do you use to keep field dry?

Answer • The methods listed included the use of cotton rolls, exodontic sponges and tissues pads, all of which allowed the aluminum oxide to collect in the mouth so that frequent rinsing and change of absorbent were necessary.

Question 10 • Do you use a local anesthetic in conjunction with airbrasive? How often?

Answer • Yes.....27
No.....17
No answer..... 3

Per cent of cases	Number reporting
10	8
20	4
30	3
40	0
50	8
60	0
70	0
80	1
90	1
100	1

Seventeen dentists made no use of local anesthetics. Of those who did use a local anesthetic the percentage of cases in which they used one was remarkably low in view of modern operative procedures. Patients were equally as tolerant of the use of the Airdent unit without an anesthetic as they are of conventional methods without one.

Question 11 • Do patients generally prefer airbrasive when you offer it?

Answer • Yes.....44
No 0
No answer..... 3

The response indicates that the airbrasive technic has a universal patient appeal.

Question 12 • State briefly reasons given by patients who reject airbrasive.

Answer • Since the answers to question 11 indicate an almost unanimous acceptance of the airbrasive technic, there were only a few scattered answers to question 12. A few patients objected to the use of the rubber dam. Some patients disliked the cold stream of carbon dioxide. Other patients, chiefly young ones, objected to the noise. There were a few who objected to the apparatus because it was new.

Question 13 • Do you use airbrasive for prophylaxis? Percentage?

Answer • Yes.....43
No 4

Per cent	Number reporting
10	6
20	3
30	1
40	1
50	5
60	1
70	1
80	3
90	9
100	13

This answer indicates that the Airdent unit was used frequently for prophylaxis.

Question 14 • Do you scale teeth before using airbrasive?

Answer • Yes.....27
No 13
No answer..... 7

Question 15 • Do you polish teeth (with pumice) after airbrasive?

Answer • Yes.....27
No 14
No answer..... 6

Question 16 • Do you feel the need for further instruction in the use of airbrasive?

Answer • Yes.....12
No 31
No answer..... 4

The answer indicates that the course as outlined was successful in acquainting the student with the airbrasive technic so that he could proceed on his own with little difficulty.

Question 17 • What improvements or changes can you suggest in airbrasive technic?

Answer • There were no suggestions made for improving the basic airbrasive technic. This response corresponds with that given for question 23.

Question 18 • Have you used the Airdent unit for dental work other than operative procedures or other types of work? If so, what?

Answer • Yes.....21
No 22
No answer..... 4

The answers show that the Airdent unit was used for cleansing castings, for indicating high spots both inside and outside of crowns, for removal of fractured porcelain facings, for removal of porcelain jackets and for gaining entrance to pulp chambers in root therapy.

Question 19 • Do you feel that airbrasive has been instrumental in increasing the number of patients referred to your office?

Answer • Yes.....26
No.....12
Questionable.... 6
No answer..... 3

Question 20 • How much additional technic work did you feel you required before using the Airdent unit on patients?

Answer • None.....24
Some.....16
No answer..... 7

Although most of the men felt they needed no additional experience, there were some who felt that further practice under guidance would have been helpful.

Question 21 • Do you find any residual dust in your operating room as a result of using the Airdent unit?

Answer • Yes.....26
No.....18
No answer..... 3

The response indicates that residual dust was present after the use of the Airdent unit. The answers were almost equally divided on how much and how objectionable it was.

Question 22 • If you do not have an assistant, can you rely on the patient to assist with the suction apparatus?

Answer • Yes.....29
No.....10
Have mechanical arm... 4
No answer..... 4

The response indicates that patients could usually be relied on to hold the suction vent in position.

Question 23 • Do you find the exercises and technics taught in the course adequate for cavity preparations?

Answer • Yes.....39
No..... 4
No answer..... 4

Question 24 • Have you overcome the problem of etched mirrors? If so, how?

Answer • Yes..... 7
No.....37
No answer..... 3

Those who answered "Yes" to this question explained that they used polished metal surfaces or large mirrors or kept the mirror out of the path of the spent powder. While this was a problem in the early days of airbrasive technic, a method for holding the mirror behind and below the suction vent has recently been developed at New York University, which definitely increases the ease of using indirect vision and, for all practical purposes, eliminates mirror frosting.

Question 25 • How does the operating cost of the Airdent unit compare with that of conventional methods?

Answer • Unknown.....14
Higher.....17
Same..... 9
Lower..... 4
No answer..... 3

Question 26 • Have you encountered any undue mechanical difficulties with this unit?

Answer • None.....40
Some..... 4
No answer..... 3

Those who had difficulty reported that adjustments were made easily to avoid the difficulty.

Question 27 • Have you experienced any mechanical exposures with the use of the unit?

Answer • None.....33
Some.....11
No answer..... 3

Question 28 • Have you applied the airbrasive technic to children's dentistry?

Answer • Yes.....30
No.....13
No answer..... 4

Question 29 • Are you more able to control recalcitrant children?

Answer • Yes	18
No	20
No answer	9

Question 30 • State briefly your feelings as to the usefulness of airbrasive technic in dental practice.

The following are some of the favorable replies:

It is a definite aid, patients are asking for it more and more. The day is not far off when every office will need the machine.

It is an adjunct that patients like and as one's skill increases with its use, one likes it more.

In the over-all picture, it has cut down my total operating time; dental procedures have been more pleasant for the patient; their reactions very favorable, etc.

Practice builder; time saver.

I feel that it has a place. The usefulness depends on the individual.

Airdent has a definite place as a supplement to the rotary drill, and does bring in patients. However, it still doesn't make dentistry more pleasant, just less unpleasant.

Has a place as an adjunct.

I believe it is definitely a great advantage to patient and dentist. Both patient and dentist are more relaxed while using Airdent. I personally find the period I use the Airdent very relaxing.

The following are some of the unfavorable replies:

It seems the Airdent is appreciated by the patients—but its limitation does not justify its cost.

I believe it will be of small use in dentistry, as the machine is developed now. I would be lost without the use of rotary instruments.

Airbrasive has definite usefulness as an adjunct to rotary tools. Frankly, at present, not as much as I originally hoped.

Good adjunct—not a precision instrument. Very difficult on the dentist.

Only good from patients' viewpoint. More tiring, time-consuming for the dentist. For men who consider patients' comfort over their own.

Question 31 • With your experience in airbrasive technic, would you recommend to others the addition of an Airdent unit in general practice?

Answer • Yes	33
No	7
Doubtful	1
No answer	6

SUMMARY

The main reason dentists have not purchased airbrasive equipment is the cost of the unit. The opinion of the majority of those represented in this small sampling is that since the Airdent unit is an adjunct and not a substitute for conventional methods, its cost is not warranted. On the other hand, those who purchased the unit found that with continued use and increased skill in handling they had a valuable aid in decreasing fear in dentistry. They indicated that the unit has a number of nonoperative uses and also that it is the method of choice in prophylaxis. They found that the noise, vibration and use of the needle, three outstanding deterrents in dentistry, were greatly reduced.

The unit was used primarily for internal cavity preparations and only sparingly for crown preparations. Most operators resorted to minimal rotary instrumentation for finishing preparations. Furthermore, as was seen in the quotations from answers to question 30, the method has tremendous patient appeal as well as operator appeal.

Although this is only a preliminary report, based on a small sampling, it appears that the dentists who use the Airdent unit find it a useful addition to the dental armamentarium. This compilation of replies bears out the original belief that an intensive one-week course is sufficient to give the graduate student enough background to start using the equipment.

Mandibular function after condylectomy

Arthur E. Smith, M.D., D.D.S., and*
Marsh Robinson,† D.D.S., M.D., Los Angeles

The purpose of this paper is to clarify the reasons for the extreme diversity of opinion regarding mandibular function after condylectomy. Two case reports will illustrate the problem. In the first case, after bilateral condylectomy, the function of the oral organ was completely destroyed and retrusion and open bite resulted. It was necessary in this case to devise a new surgical procedure for the reconstruction of the temporomandibular joints. In the second case, bilateral condylectomy was performed by one of us (A.E.S.) more than 16 years ago. This patient has been able to use her mandible throughout the years. Comment will be made on the neuromuscular mechanism which permits one patient to function without the condyles while in another patient any semblance of function is impossible.

Thoma[1] gives the indications for condylectomy. Condylectomy is used if arthritis progresses in spite of treatment and is associated with pain during mastication; in partial ankylosis whether caused by traumatic arthritis, malunion of fracture, rheumatoid arthritis or osteomyelitis; in synarthrosis caused by bony hypertrophy or osteoma of the condyle. Although the treatment of ankylosis is termed arthroplasty, it is essentially a process of excision. Therefore it is well to review cases of the past where condylectomy has been performed in order to learn the loss of function that has resulted. The first condylectomy, as reported by Rushton,[2] was done by Humphrey of Cambridge in 1856 for the treatment of arthritis of the temporomandibular joint. Gonzalez-Ulloa[3] has advocated recently the old surgical procedure of bilateral condylectomy for the correction of mandibular prognathism. The subject of mandibular function after condylectomy must necessarily include the anatomy and physiology of the lost parts, that is, the form and function of these parts. It should be kept in mind that the function of the temporomandibular joints is not only that of mastication but is also concerned with deglutition, speech, and posture of the head. The patient's appearance or psychologic attitude toward loss of form or function also must be considered. In the loss of these structures, whether from trauma, infection or other reasons, the loss of function must be analyzed as the aim of the healing arts is to restore lost bodily function.

*Professor of reconstructive plastic, maxillofacial and oral surgery, School of Dentistry, University of Southern California; chairman of plastic surgery department, St. Vincent's Hospital.

†Associate professor of oral pathology, School of Dentistry, University of Southern California; associate, department of oral surgery, School of Medicine, University of Southern California.

1. Thoma, K. H. Oral surgery. St. Louis, C. V. Mosby Co., 1948.

2. Rushton, M. Unilateral hyperplasia of the mandibular condyle. Proc. Roy Soc. Med. 39:431 (May) 1946.

3. Gonzalez-Ulloa, Mario. Temporomandibular arthroplasty in the treatment of prognathism. Plast. & Reconst. Surg. 8:136 (Aug.) 1951.

TEMPOROMANDIBULAR JOINT AS CURRENTLY DESCRIBED

The bony parts forming the joint are the condyle of the mandible and the mandibular fossa and articular tubercle of the temporal bone. A capsular ligament, thin and loosely arranged, is attached above to the margin of the articular surface and below to the neck of the condyle. Placed between these two bones is a plate of specialized connective tissue, the articular disk.

The external pterygoid muscle originates with two heads: the smaller upper head from the infratemporal surface of the great wing of the sphenoid bone below the infratemporal crest, the lower head from the lateral surface of the lateral pterygoid plate, the pyramidal process of the palatine bone and partly from the maxillary tuberosity. The fibers converge backward and laterally to be inserted in a depression in the anterior aspect of the condyle neck and the anterior edge of the disk.

Lauritzen[4] has described the temporomandibular joint as follows:

> In order to make the movements of the mandible a little better understood, a few salient points must be mentioned. The condyle is not in the fossa but on the posterior slope of the articular tubercle. The temporomandibular joint is a hinge joint with a movable socket. All hinge joints have collateral ligaments. In the temporomandibular joint the inner fibers of the capsular ligament form distinct collateral ligaments from the meniscus to the mandible. This means that wherever the mandible goes, the meniscus goes. The upper portion of the external pterygoid muscle inserts into the anterior part of the capsule. In this region the capsule is attached to the meniscus. The lower part of this muscle inserts into the neck of the condyle anteriorly. There is no muscle which can retrude the meniscus *per se*.
>
> The physiology is easier understood when the temporomandibular articulation is regarded as two separate joints, the menisco-condylar joint and the temporo-meniscus joint. The only motion that is made, or can be made by the menisco-condylar joint is that of opening and closing; a purely rotational hinge movement. The temporo-meniscus joint is the movable socket of the menisco-condylar joint. The temporo-meniscus joint performs all sliding movements and carries the meniscus and condyle to all eccentric positions. This sliding takes place between the meniscus and the posterior slope of the articular tubercle.

STRUCTURES REMOVED IN CONDYLECTOMY

In condylectomy, the head of the condyloid process and the disk are removed with a part of the neck of the condyle, the insertion of the external pterygoid muscle, the capsular ligament, the external lateral or temporomandibular ligament as well as the proprioceptive or muscle joint and tendon sensory nerves to the joint.

LOSS OF FUNCTION DUE TO LOSS OF STRUCTURE

Thompson and Brodie[5] have stated:

> In normal opening, it has been found that the external pterygoid muscle plays the major role by pulling the head of the condyle downward and forward, while the hyoid bone is maintained at a constant level. This means that this particular muscle is contracting while the other three muscles, namely, masseter, internal pterygoid and temporal, although controlled by the same nerve, are relaxing. The suprahyoid group tenses only enough to prevent the hyoid from descending. Where the external pterygoid has been interfered with, as in resection of the condyle, the picture is quite different. It is now found that the patient is scarcely able to open the mouth immediately after the operation. As time goes on however, the suprahyoid and infrahyoid muscles are reeducated and take over the function of depression of the mandible. In order to do this, it is necessary that the infrahyoid muscles pull the hyoid bone to constantly lower levels with each degree of opening in order that mechanical advantage be increased. Such movement is always of the hinge type, and the opening, even after the lapse of a year, is always markedly diminished to below the normal.

4. Lauritzen, Arne G. Function, prime object of restorative dentistry: a definite procedure to obtain it. J.A.D.A. 42:523 (May) 1951.

5. Thompson, J. R., and Brodie, A. G. Factors in the position of the mandible. J.A.D.A. 29:925 (June) 1942.

The opening of the mouth not only depends on the motion of the lower jaw downward but also on the upper jaw being raised by the muscles which extend the head back. This may be verified by putting the blade of a knife or by inserting a fingernail opposite to the conjoined edges of the teeth when the mouth is shut. If the knife is held unmoved while the mouth is opened, one can see with the help of a mirror the upper teeth raised remarkably at every operation performed.[6] Root[7] also emphasized the function of the external pterygoid muscle and the forced-opening movement of the jaw being taken over by the inframandibular muscles after condylectomy.

The anterior fibers of the capsular ligament and the temporomandibular ligament are two important structures which prevent the posterior movement of the mandible that are lost in condylectomy. In thinking of these problems it must be borne in mind that there are two joints and two sets of muscles and ligaments. Movements of one side cannot be considered alone. When condylectomy has been performed on one side only, many of the functions of that side are aided by the normal opposite joint.

Thoma[1] speaks of the tendency to posterior displacement of the jaw and advocates the use of Jelenko splints to be attached to the upper and lower arches for use with elastic traction to correct or to maintain normal occlusion. These elastics are placed in an oblique position to overcome the loss of the external pterygoid muscle. This is particularly important in bedridden patients with arthritis since there is an added tendency to distal displacement when the patient lies on his back.

Dingman,[8] discussing condylectomy, states:

> . . . in our bilateral cases operated upon in one stage, a retrusion deformity of about 4 millimeters resulted. This was not severe but was sufficient to throw the teeth out of normal occlusion. In subsequent cases it has been found desirable to operate the bilateral ankylosed joints in two stages allowing from four to six weeks to elapse before operation of the second side. This lapse of time permits sufficient organization on the first side operated upon to prevent posterior displacement of the mandible. Function in bilaterally operated patients is excellent except for protrusive and lateral motion, both of which are not possible because of destruction of the insertion of the external pterygoid muscles. The vertical dimension is maintained by the occlusal relationships.

Padgett[9] states,

> . . . the results of the operation [condylectomy] for bilateral ankylosis are problematical. It may be difficult to hold the jaw in position if the ankylosis is corrected. It might be better to do Risdon's operation on one side and excision of the condyle on the other.

The open bite which is caused by condylectomy is well illustrated by the result of a case reported by Gruca and Meisels.[10] They state,

> the face was somewhat asymmetric, for half (the right side) of the jaw remained from ½ to ¾ centimeter too low. The incisors of the jaws were also not in contact, for the lower molars were too long.

Posterior teeth were extracted to correct the open bite.

As there is loss of the muscle, joint and tendon sensory nerves, there is a disturbance in the guide to the intricate mandibular movements. The chewing reflex and the positional reflex, as pointed out by Sherrington,[11] are disturbed from loss of neuromuscular control.

6. Monro, Alexander. Remarks on articulations, muscles of luxation of the lower jaw. In Medical essays and observations, vol. 2, ed. 5. Society in Edinburgh, 1771, p. 103-105.

7. Root, R. W. Mechanics of temporomandibular joint. Am. J. Orthodont. & Oral Surg. (Oral Surg. Sect.) 32:113 (Feb.) 1946.

8. Dingman, R. O. Ankylosis of the temporomandibular joint. Am. J. Orthodont. & Oral Surg. (Oral Surg. Sect.) 32:120 (Feb.) 1946.

9. Padgett, E. C., and Stephenson, K. L. Plastic and reconstructive surgery. Springfield, Ill., Charles C Thomas, 1948.

10. Gruca, A., and Meisels, E. Asymmetry of the mandible from unilateral hypertrophy. Ann. Surg. 83:755 (June) 1926.

11. Sherrington, C. S. Reflexes elicitable in cat from pinna vibrissae and jaws. J. Physiol. 51:404 (Dec.) 1917.

HEALING OF CONDYLECTOMY WOUND INCREASES DISABILITY

The scar tissue which forms in the region of the removed condyle undergoes contraction and increases the open bite. This scar tissue also contributes to the limitation of motion.

CASE 1

This is a preliminary report of a 27 year old, white, male veteran who was admitted to the plastic and oral surgery service of one of us (A.E.S.) at the United States Veterans Hospital, Los Angeles, in July 1948. He complained of painful malposition of the jaw following a bilateral condylectomy which had been performed one and a half years previously.

The present illness began in the fall of 1941. While in Army service he had received a blow to the chin which resulted in a fracture of the body of the left side of the mandible. He had been treated at an Army hospital with intermaxillary wiring and was discharged to duty after 12 weeks. In 1943, during a hand-to-hand combat with a Japanese soldier, he had received a blow on the left side of his face with a rifle butt which caused a fracture of the left condyle with dislocation. The patient's jaws were then immobilized with intermaxillary wires and he was evacuated to an Army hospital in the United States. Six months later, the intermaxillary wires were removed and one week after, a bilateral dislocation of the jaws occurred. The dislocation was reduced but during the next two weeks the bilateral dislocation recurred five times. After the fifth reduction the jaws were immobilized with intermaxillary wires. After six months the wires were removed and the patient discharged from the Army. Three days after his discharge, bilateral dislocation recurred and he was readmitted to an Army hospital. Conservative treatment by means of intermaxillary wiring alone was given up. He was treated by surgical procedures during the next three years in four Army and two Veterans hospitals. During this time surgical repair of the left condyle was attempted twice and the right condylar region operated on once. After these operations the jaws were immobilized by intermaxillary wires for periods of eight, two and five months respectively. After the removal of the intermaxillary wires, on each occasion, bilateral dislocation of the condyles occurred. During the latter part of 1946 a bilateral condylectomy was performed and the patient's jaws were rewired. After one year the wires were removed and the patient was released to civilian life. He worked only a few days as a practical nurse when the mandible was suddenly displaced posteriorly which resulted in an open bite and severe pain in the temporomandibular joint regions. The patient was admitted to a Veterans hospital and during the next year he suffered four posterior displacements of the mandible. These were reduced under general anesthesia. Over a period of five and a half years this patient was admitted to four Army installations and five Veterans hospitals. The jaws were wired eight times, and there were 15 bilateral dislocations after the removal of the wires. The left condyle was operated on twice, the right condyle once, after which both condyles were removed and the jaws were wired for one year. The jaws were wired for a total of three and a quarter years.

Physical examination revealed a well developed, well nourished, white man, who appeared to be of the stated age. The mandible was retruded approximately 2 cm. and an open bite of about 2 cm. was present (Fig. 1). There was 3-plus tenderness over both temporomandibular joint regions. The muscles of mastication exhibited 1-plus tenderness bilaterally. The right parotid gland was moderately swollen and tender.

Roentgenographic examination (Fig.

2) disclosed absence of the two condyles and a right parotid sialogram was consistent with chronic parotitis. The diagnosis was postsurgical absence of the right and left condyles; posterior displacement of the mandible with open bite; tension pains in the muscles of mastication due to malocclusion; chronic parotitis on the right side.

Surgical Treatment • The objective of the surgical treatment was to create normal intermaxillary relation, normal occlusion and profile and to give the patient movable joints capable of mastication. Two preliminary procedures were carried out: (1) reduction of the displaced mandible and fixation by intermaxillary wires (Fig. 3), and (2) the ligation of

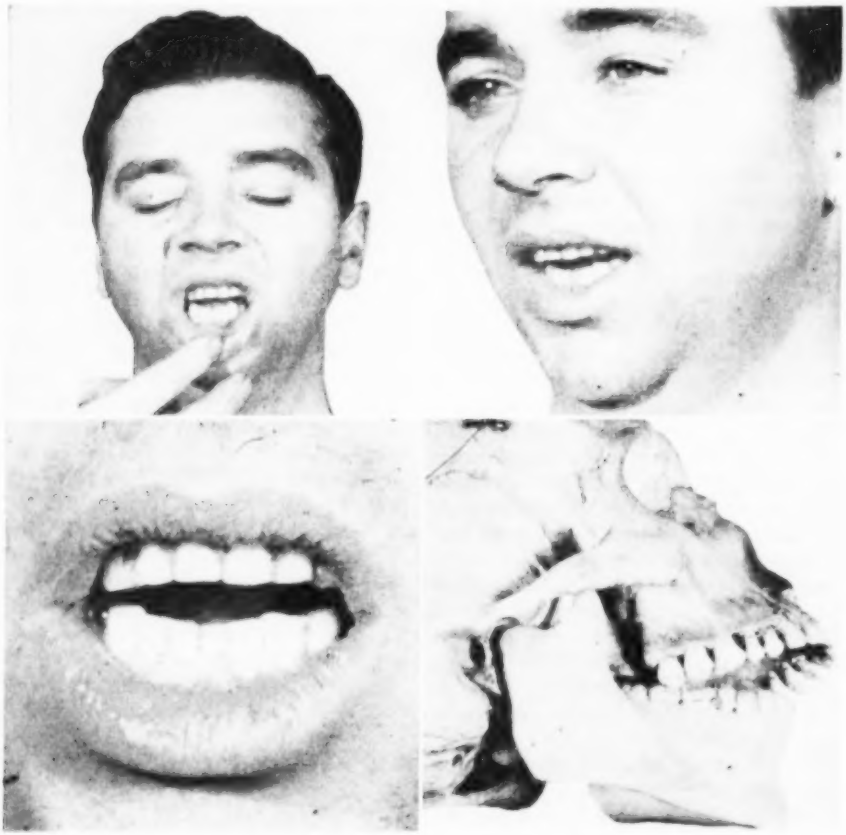


Fig. 1 • Above left and right: Preoperative photographs of patient taken in July 1948. Posterior teeth are in contact. Note open bite deformity due to loss of condyles, also retrusive open bite malocclusion and loss of normal profile. Below left: Posterior teeth are in contact. Note open bite. Below right: Model of intermaxillary relation of jaws of patient when first seen in July 1948. Note posterior displacement, open bite and absence of right condyle. Similar deformity existed on left side

Fig. 2 • Planigraph of right condylar region taken August 30, 1948. Note absence of right condyle. A similar condition existed on left side

the right and left external carotid arteries.

Iliac Bone Grafts for Reconstruction of Condyles • After shaving the hair 2 cm. above and anterior to the ear, the incision was outlined in brilliant green along the anterior margin of the ear, from the lobule upward to a point 1 cm. above the hairline and then anteriorly to the extent of 5 cm. The third division of the fifth cranial nerve was blocked at the foramen ovale with 3 cc. of 2 per cent procaine solution. The incision as outlined was made. The skin flap was elevated and immobilized with two silk sutures to the medial portion of the cheek. After the temporomandibular fossa was located by palpation, the tissues were divided laterally by blunt dissection. The fossa and the upper end of the ramus were exposed through a 2.5 cm. opening. The ramus fragment was prepared to receive the lower end of the bone graft. All tissue was removed from the glenoid fossa. The distance between the prepared upper mandibular fragment and the central portion of the glenoid fossa was determined. To this measurement, 1 cm. was added for lingual contact between the lower notched end of the graft and the upper end of the ramus. Under local anesthesia, a section of bone, which cor-

Fig. 3 • Model showing normal intermaxillary relation and occlusion established by intermaxillary wiring preparatory to surgery. Right side

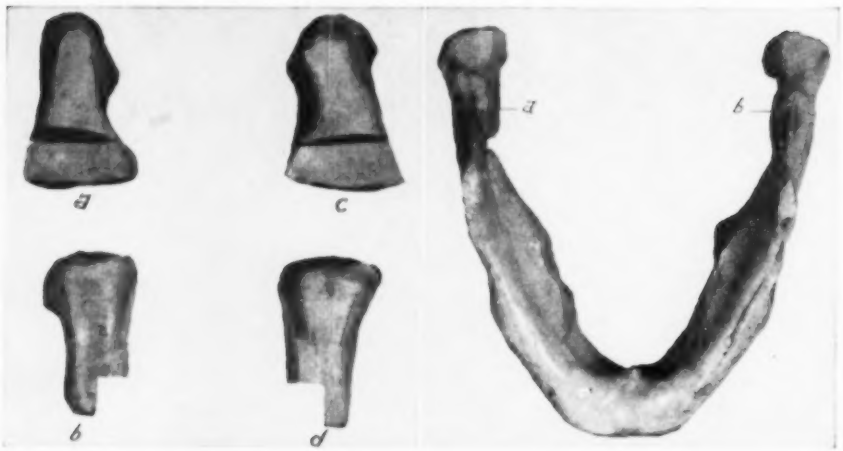


Fig. 4 • Left: Models showing carved form of iliac bone grafts. Note prepared notch on bone grafts, a and b, left; c and d, right. Right: Model of mandible, inferior view. Note lingual steps (a and b) of grafts for greater bony contact

responded to the pattern as to length and width, was removed from the crest of the ilium. This section of bone was carved as shown in Figure 4, left. The prepared bone graft was placed in position, the convex upper end fitted into the glenoid fossa and the notched lower end over the prepared end of the ramus (Fig. 4, right). The graft when inserted was in good apposition to fossa and ramus (Fig. 5). The notch in the lower end of the graft supplied ample contact on the superior and lingual surfaces of the ramus. The wound was closed by approximating the divided tissues with two no. 00 chromic gut mattress sutures. The cheek flap was returned to its original position and approximated with no. 000 interrupted silk sutures. A small Penrose drain was inserted below the ear lobule and a moderate-pressure dressing applied.

Fig. 5 • Model showing right condyle restored by means of iliac bone graft, March 30, 1949

The left condyle was reconstructed December 29, 1948, and the right condyle March 30, 1949.

Periodic roentgenographic examinations were made (Fig. 6).

Preparation of Nonelectrolytic Metal Onlays • Since the function of the external pterygoid muscle had been lost, the wax pattern for the metal onlays was constructed in such a manner that the interposed metal between the new grafted ankylosed condyle and ramus

would be 3/32 of an inch wide and would be in the arc of a circle, the center of which passed through the center of the reconstructed condyle (Fig. 7). A small tab for a drill hole was turned down so the onlay could be fixed by a screw to the ramus. The right and left metal onlays were constructed of nonelectrolytic metal.

Osteotomy and Creation of New Temporomandibular Joints by Means of Nonelectrolytic Metal Onlays • On March 23, 1950, the right graft was surgically exposed in a similar manner to that described earlier. A slot 3/32 of an inch wide (Fig. 7, left) was created to conform to the previously prepared onlay, at the point of bony union between the bone graft and ascending ramus. This onlay was fixed to the ramus by a self-tapping nonelectrolytic metal screw (Fig. 8). The wound was closed in the manner described earlier.

On June 7, 1950, osteotomy was performed and a new left temporomandibular joint created in a similar manner. Periodic roentgenographic examinations were made (Fig. 9).

Course • The patient (Fig. 10, above) had uneventful postoperative recoveries.

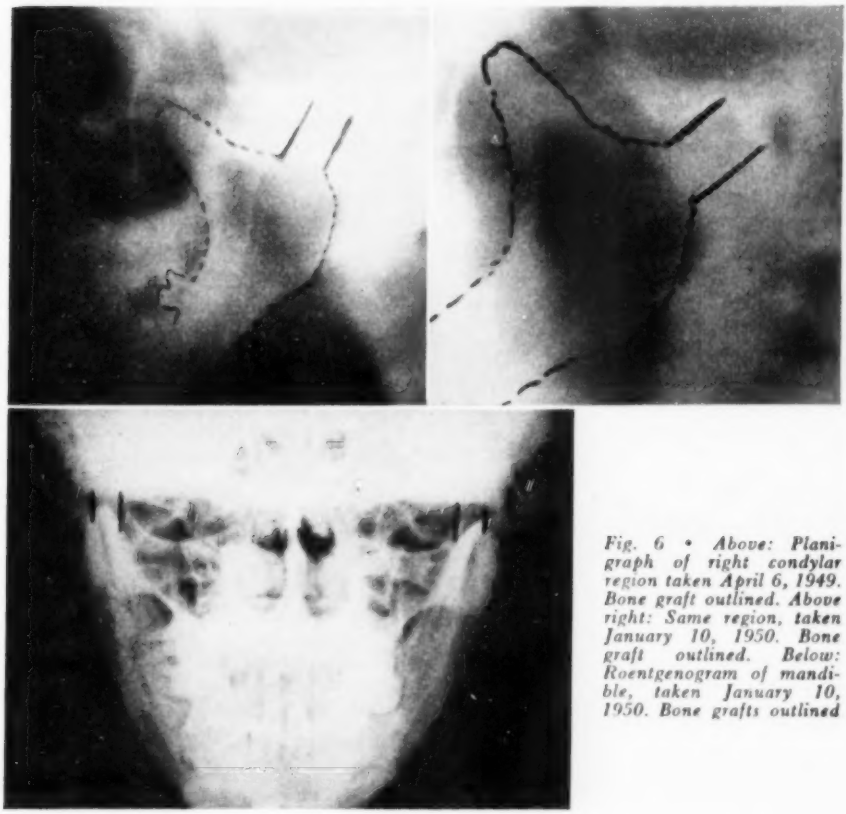


Fig. 6 • Above: Planigraph of right condylar region taken April 6, 1949. Bone graft outlined. Above right: Same region, taken January 10, 1950. Bone graft outlined. Below: Roentgenogram of mandible, taken January 10, 1950. Bone grafts outlined

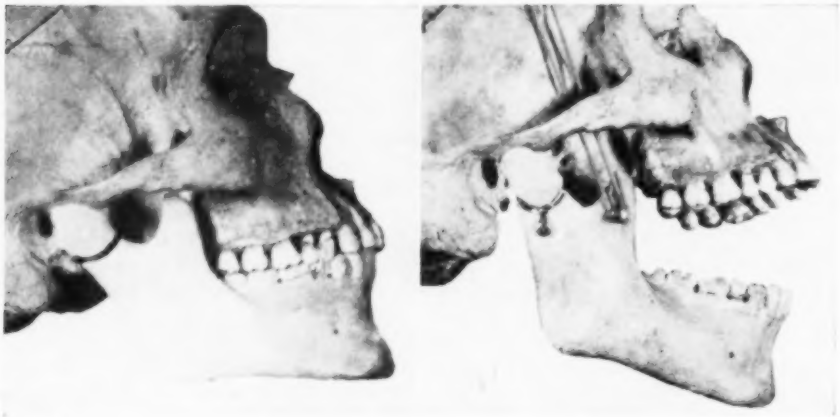


Fig. 7 • Left: Model showing curved slot, 3/32 inch wide, cut in bone at lower end of right condylar graft. Curve is arc of circle with center at hinge axis. Right: Model showing hinge opening after creation of new joints. Right side

The right chronic parotitis progressed until it was necessary, on January 30, 1950, in the middle of the procedures described, to remove the right parotid gland. The intermaxillary wires were left in place until September 14. After they were removed the patient (Fig. 10, below) had normal intermaxillary relation, centric occlusion, a hinge-type masticatory function and a normal profile. His attitude toward his long disability improved. Since the completion

Fig. 8 • Left: Model showing right nonelectrolytic metal onlay in curved slot. Note tab with screw fixing onlay to mandible. Right: Model of mandible, superior view. Note concave onlays; curvature is arc of circle through hinge axis of mandible

of the surgery the patient has married, is working part time and attending college.

CASE 2

A 19 year old, white, single girl consulted one of us (A.E.S.) on May 20, 1935, complaining of pain in the region of both mandibular joints. She had been injured a week previously in an automobile accident. She had suffered multiple fractures of the lower jaw with contusions about the face and cerebral concussion. She had received no treatment other than a Barton bandage and one intermaxillary wire (Fig. 11).

Examination revealed numerous ecchymotic areas about the face, eyelids and lips, with moderate edema in both cheeks. The right lower lateral incisor was missing and the socket contained pus. The mucous membrane on both labial and lingual sides was lacerated and ruptured in the region of the symphysis. A foul purulent discharge was escaping from the deeper tissues. The tissues of the floor of the mouth showed considerable induration which extended beneath the symphysis. Both submaxillary glands were palpable and tender. The lower jaw was approximately 1 cm. in retrusion. Manipulation of the right and left sides of the mandible disclosed the parts to be very mobile. It was impossible to occlude the lower teeth to the upper arch. The teeth on each side were lingually inclined with the lower border of the mandible tipped outward.

Roentgenographic examination of the lower jaw revealed a fracture of the symphysis of the mandible with an additional fracture of the lingual plate including the genial tubercles (Fig. 12, above, right). The bone fragment was displaced 3.5 cms. posteriorly in the floor of the mouth. Stereoscopic roentgenograms disclosed that both condyles were displaced from their sockets. The right condyle was fractured, dislocated and rotated; the coronoid process was fractured and separated from its base (Fig. 12, left). On the left side the fractured condyle was displaced downward approximately 2 cm., dislocated and rotated, with the fractured end assuming a posterior position (Fig. 12, below right). After consultation with M. M. House of Whittier, Calif., and John B. LaDue of Chicago, it was agreed that a bilateral condylectomy should be performed.

Fig. 9 • Right lateral view of mandible taken September 14, 1950. Graft outlined. Note metal onlay

Bilateral Condylectomy • Three days later, which was ten days after the accident, the patient was admitted to St. Vincent's Hospital for surgery. On the left side, a perpendicular 3 cm. incision was made through the skin, just anterior to the ear. Blunt dissection was used thereafter. When the posterior portion of the masseter muscle was divided along the lower surface of the zygoma, a hematoma was encountered. The condyle was found to be almost completely detached. It was located 1.5 cms. anterior and below the glenoid fossa. The neck was directed posteriorly and medially and was overriding the lower fragment (Fig. 13, above). The external pterygoid muscle was entirely detached and the condyle was devoid of the meniscus and

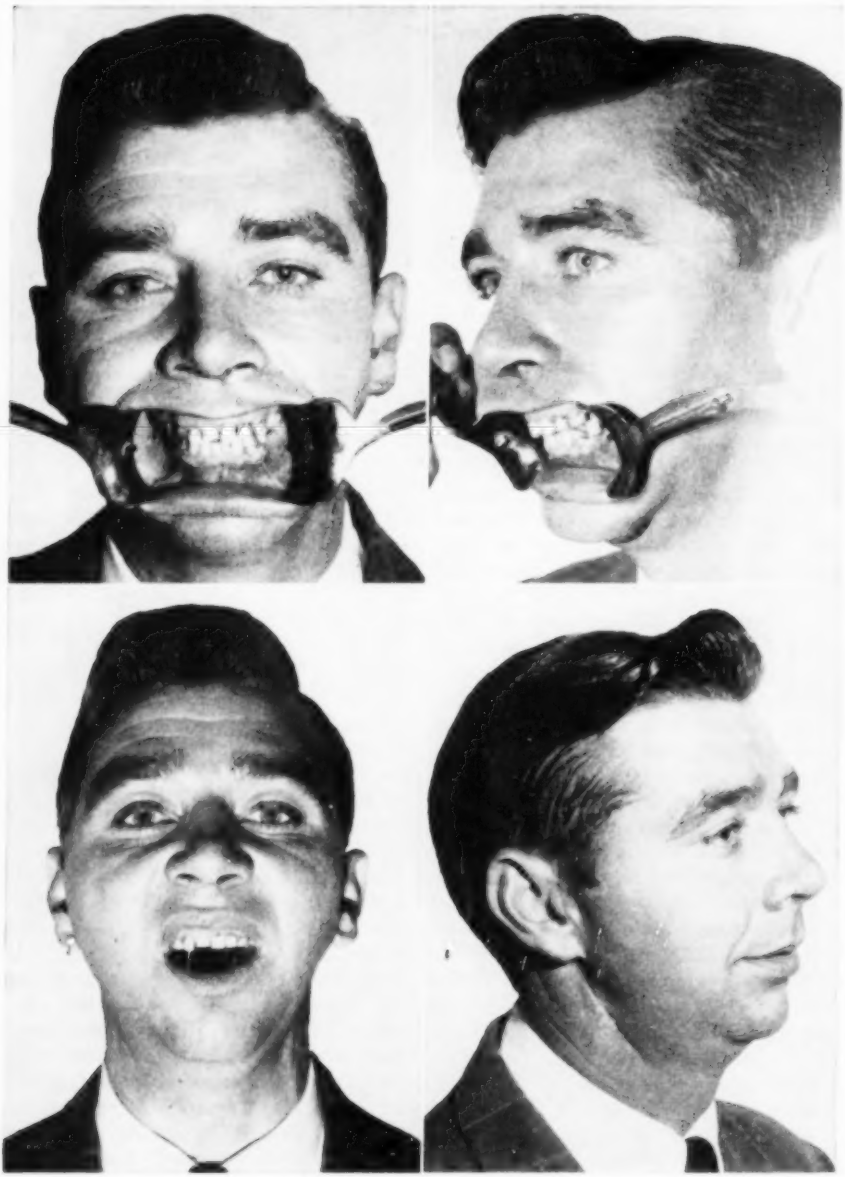


Fig. 10 • Above left and right: Postoperative photographs showing intermaxillary relation and occlusion preceding final removal of intermaxillary wires. Below left: Immediately after removal of intermaxillary wires. Note mouth open with new temporomandibular joints in action. Below right: Note normal profile with absence of mandibular retrusion and open bite

capsular ligament. The condyle was literally picked out of the hematomatous region.

The right side was operated on seven days later. A 3 cm. perpendicular incision was made through the skin, just anterior to the ear. The subdermal tissues were divided by blunt dissection. When the fascia and muscle tissues were divided, approximately 10 cc. of dark blood escaped under pressure from the region of the temporomandibular joint. The fractured condyle was found in a horizontal position. The fractured neck was in the glenoid fossa with the capitulum located anteriorly. The meniscus, capsular ligament and external pterygoid muscles were torn from the bone (Fig. 13, below). The condyle was easily removed and was found to be entirely void of soft tissue. The change in the position of the fractured condyles from the time of the roentgenographic examination to the time the surgery was performed was probably caused by the manipulation of the jaw during general anesthesia. These changes in position showed how complete was the detachment of these bony fragments from the soft tissue.

Four days after the condylectomy, a second operation was performed which consisted of an open reduction of the fracture through the symphysis and the removal of the broken fragment and the immobilization of the right and left mandibular segments by adjustment of cast silver splints to buccal and labial surfaces of teeth, combined with intermaxillary wiring. A 3.5 cm. curved incision was made through the tissues below the chin to expose the fracture line and the lower border of the symphysis. The fractured ends of the bone assumed an inverted V position because of muscle action. The lateral halves of the mandible were tipped laterally which placed the teeth in a lingual position. The section of bone, which was separated from the lower border of the symphysis and had been forced 3.5 cm. posteriorly through the floor of the mouth beneath the tongue, was removed. The two mandibular fragments were extremely mobile. The teeth were brought into occlusion and intermaxillary wires inserted. In order to retain approximation of the fragments at the lower end of the symphysis and to correct the divergence of the lower borders of the mandibular fragments, it was necessary to ligate the fragments with a stainless steel wire. The wire was removed two weeks later to prevent sequestrum formation. A small bolt was inserted to connect the two halves of the cast silver splint. The intermaxillary wires were adjusted and the bolt tightened. The teeth were in excellent occlusion. The metal splint was constructed to preclude interference with occlusion. This mechanical construction, consisting of cast silver splints, interosseous stainless steel wire ligature, and intermaxillary wiring, efficiently immobilized the broken jaw fragments. Preinjury occlusion was restored.

Fig. 11 • Preoperative photograph of patient, May 20, 1935

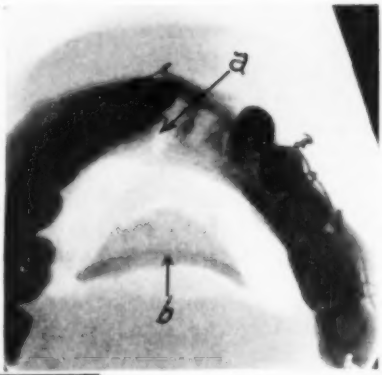
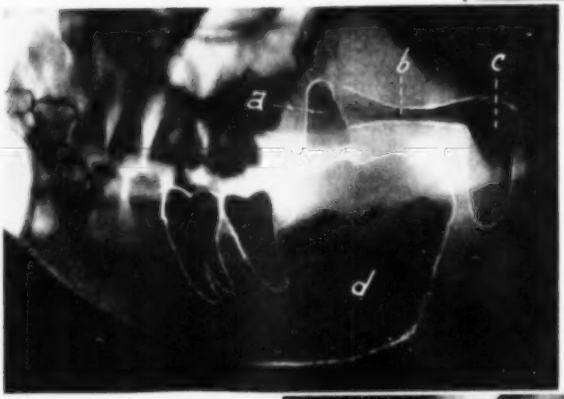
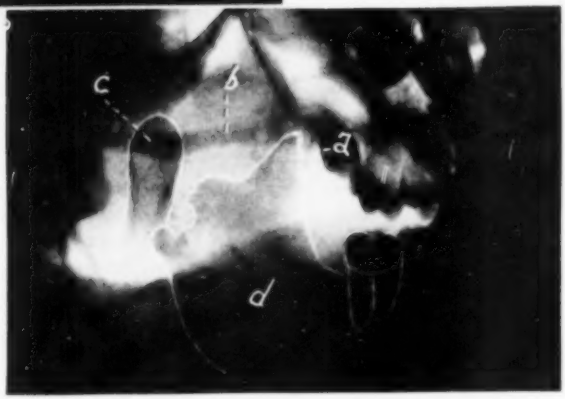


Fig. 12 • Right: Occlusal roentgenogram taken May 20, 1935. a, fracture in right incisor region; b, fractured lingual plate with genial tubercles displaced in floor of mouth



Left: Right lateral view of mandible taken May 20, 1935. a, fractured coronoid process; b, zygomatic arch; c, fractured and dislocated condyle; d, right ramus



Right: Left lateral view of mandible taken May 20, 1935. a, coronoid process; b, zygomatic arch; c, fractured and dislocated condyle; d, left ramus

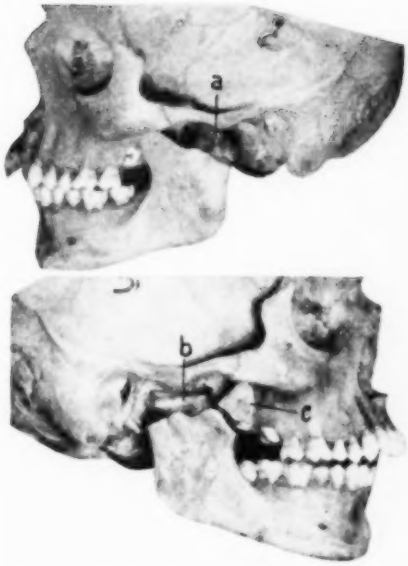


Fig. 13 • Model showing fractures and dislocations. Above: Left lateral view; a, fractures and dislocated left condyle. Below: Right lateral view; b, fractured and dislocated right condyle; c, fractured coronoid process

Fig. 14 • Above: Cast arch bars on model showing direction of elastic traction to overcome retrusive open bite deformity. Below: Model showing occlusion of teeth 14 months after surgery and six months after treatment with the intermaxillary traction

The patient was discharged from the hospital in one week and made an uneventful recovery. The intermaxillary wires were removed after eight weeks. Within a few hours after their removal, the lower jaw was retruded 5 mm. Models were then made from new impressions of the upper and lower arches. Castings from silver were made to cover the buccal and labial surfaces of the upper and lower teeth. Hooks were attached to the upper arch bar in the area of the cuspids and to the lower arch in the area of the second molars. These form-fitting cast appliances were fastened to the teeth with stainless steel wire. The hooks were connected by rubber bands to create forward elastic tension which prevented retrusion of the lower jaw until nature produced a more resistant buffer defense to compensate for the lost condyles (Fig. 14). The result obtained from the elastic tension was closely observed until the 5 mm. retrusion (which followed removal of intermaxillary ligation) was corrected, then a constant elastic tension was maintained continuously for eight months, after which time treatment was discontinued.

It was reported at that time[12] that normal intermaxillary relation and occlusion resulted from this treatment (Fig. 15). The patient was presented at a dinner meeting of the Los Angeles Dental Society. Several hundred dentists observed this patient eat her meal and many examined her. It was agreed at that time that this patient had a satisfactory masticatory function with normal occlusion and profile.

The patient moved to Wisconsin and was not seen for about 16 years. To obtain scientific data the patient was located and re-examined October 9, 1951. Many

12. Smith, A. E., and Johnson, J. B. Bilateral condylectomy in a patient with multiple fractures of the mandible. Illinois D. J. 9:158 (May) 1940.

changes had taken place in the intervening 16 years in the maxillofacial and dental mechanism. This patient now showed the typical loss of function (Fig. 16). The mandible had retruded and open bite was present with a slight right lateral deviation. Mandibular movement was of the pure hinge type. This malocclusion caused abnormal stresses in direction and amount on the contacting teeth which had caused the loss of the left maxillary molar teeth three years after the condylectomy. To prevent the loss of the remaining teeth and to attempt correction of the malocclusion, the posterior teeth had been ground at regular intervals during the intervening 13 years. The posterior teeth had been ground until there is no space between the upper and lower arches on the right side and only 2 mm. in the left third molar area. A slight amount of lateral movement is present. An open bite still exists. She is a dental cripple. It is our intention to correct her deformity using the new procedure outlined in Case 1.

Fig. 15 • Above left and right: Patient 14 months after bilateral condylectomy. A normal profile and normal occlusion were thought to have been permanently established. Below: Showing ability to open mouth 14 months after bilateral condylectomy

Fig. 16 • Left and right: Photographs of patient taken October 9, 1951, 16 years after bilateral condylectomy. Note loss of normal profile, the retrusive open bite malocclusion and loss of posterior vertical dimension caused by the grinding of teeth in attempt to correct deformity. Below: Note loss of posterior vertical dimension

DISCUSSION

In a recent article Gonzalez-Ulloa,[8] advocating temporomandibular arthroplasty in the treatment of prognathism, states,

> the object of the operation is to shorten the two condyles; with this procedure the mandible shifts in an upward and backward direction in proportion to the resected fragment of the condyles.

We agree that this upward and backward shift is what occurs, but how this procedure can be used for the correction of prognathism is not understood. He illustrates his paper with a case of prognathism which is associated with open bite. The posterior shifting of the mandible after bilateral condylectomy corrects the protrusive part of the deformity but accentuates the open bite. He recommends "removal of the last molars to avoid open bite when necessary." It appears that in removing part or all of the condyle, the last molar teeth must be extracted to prevent the occurrence of an open bite. In the cases he describes no time element was disclosed. The immediate apparent corrective result following bilateral condylectomy, as

has been shown in Case 2, does not justify optimism. Progressive retrusive open bite deformity occurs. Gonzalez-Ulloa states, "a fine curved and sharp rugine is introduced behind the condyle to detach the upper insertion of the external pterygoid muscle." Possibly this is a misprint as the upper portion of the external pterygoid muscle inserts into the anterior border of the disk, while the inferior portion of this muscle inserts into the anterior aspect of the condylar neck. Evidently in this surgery the insertion of the external pterygoid muscle is interrupted and, as has been shown previously, he thereby reduces the masticating motions in these mandibles to a pure hinge-type of action. He states, "immediate restoration of mandibular function is an advantage over other types of operations." Immediate motion is not an advantage but a necessity to prevent ankylosis. Conservation of joint tissues is a fundamental principle in orthopedic surgery. His technic cannot be justified. His procedure is not new. Dufourmentel,[13] in 1931, recommending the operation, stated that in 1895 Jaboulay performed bilateral condylectomy for the correction of prognathism. Condemnation of the technic is not new. Padgett and Stephenson[9] state, "the disadvantage of Dufourmentel's operation is that in addition to destroying the joint, sometimes it is followed by open bite." Winter[14] states,

> the disadvantages to this operation are many. The operation per se, may entail a permanent destruction of the temporomandibular articulation with its resultant upset of the very delicate muscular action balance.

Dr. Winter further criticizes condylectomy in cases of prognathism by stating,

> the correction of the deformity is overcome to a very small degree because of the decreased possibility for the posterior retraction of the mandible as there exists but little area for reduction in the glenoid fossa. In many of these cases the malocclusion is increased rather than decreased because the reduction of the deformity is not so much in a posterior retraction as in a superior elevation.

It is not the purpose of this paper to discuss the merits of different types of surgery for the correction of prognathism but only to point out the destructive nature of bilateral condylectomy. There are methods[15] for correction of prognathism which do not destroy the joint or necessitate the removal of molar teeth to overcome an open bite.

Recently Gottlieb[16] reported three cases of condylectomy performed on long-standing dislocations of the joints. His three cases were observed following condylectomy for one year, eight months and three months respectively. He reported that "after the operations masticatory function was painless and adequate in all cases, and the appearance of the patients was not changed." This early enthusiasm over these operative results may be as unwarranted as was the enthusiasm in Case 2 discussed here. More cases must be followed for long periods of time.

COMMENT

Normally the mandible does not function as a lever of the third class.[17] It is the broad temporalis muscle that is the equilibrator of forces within the denture. Normally the resultant of the forces exerted by the muscles of mastication is transmitted in the denture area to the maxilla. Without the condyles, as is illustrated in Case 2, the patient's neuromuscular mechanism can be educated to place the major force within the denture area, thereby allowing no leverage of the third class. This re-education of the

13. Dufourmentel, L. Le traitement chirurgical du prognathisme. Presse Medicale 29:235 (May 23) 1921.
14. Winter, Leo. Operative oral surgery. St. Louis, C. V. Mosby Co., 1947.
15. Smith, A. E., and Robinson, Marsh. Surgical correction of mandibular prognathism by open condylotomy ostectomy; a new technique. In preparation.
16. Gottlieb, Otto. Long-standing dislocation of the jaw. J. Oral Surg. 10:25 (Jan.) 1952.
17. Robinson, Marsh. Temporomandibular joint: theory of reflex controlled nonlever action of the mandible. J.A.D.A. 33:1260 (Oct.) 1946.

masticatory motor action in this patient allowed mandibular function over a period of 16 years. As is shown in Case 1, the muscles may function with a leverage of the third class, pulling the mandible posteriorly in the absence of the condyles, thus creating an open bite. This illustrates the type of patient where the neuromuscular mechanism cannot be re-educated to function without the condyles. The extreme diversity of opinions of observers in the past, some who say that function is not possible and others who say that function is possible after condylectomy, can be explained by the type of patient observed by these men.

W. J. Pryor[18] reported an edentulous case that he had observed for 10 years, following bilateral condylectomy for ankylosis. He states, "after the condyles were removed and full dentures constructed, he masticated with great satisfaction to himself and me. He chopped straight up and down and never appeared to close out of centric occlusion." M. M. House[19] observed Case 2 as well as Dr. Pryor's case. He states, "from my observation of the cases referred to, I have reason to feel that such cases can have a fair degree of functional service." Dr. House is of the opinion that the surgical procedure outlined in Case 1 is expedient and justified, as nothing should be left undone to serve these people. B. B. McCollum,[20] commenting on the new surgical procedure in Case 1, states, "I do not think full masticatory efficiency can be performed. Neither can full efficiency be restored with any artificial restoration of any member of the body, but with enough efficiency so that a person can get along. The correction of the deformity is enough to justify the operation." Carl Boucher[21] has had experience with one case of bilateral condylectomy and several cases where one condyle was removed. He states that "the function of the temporomandibular articulation is chiefly one of stabilization and control of the jaw, when the jaw is open or in eccentric positions when the teeth are not in contact. It is possible for the jaw to function in mastication without the condyles, but only in a vertical direction." Harry Sicher[22] states that, "mastication in our day and age is on the whole not a difficult job. A person like your patient can in all probability chew, if not efficiently, at least satisfactorily, if minimum care is taken in selecting his diet." Dr. Sicher is of the opinion that condylar reconstruction should be reserved for the cases where re-education of the patient to some satisfactory masticating activity has failed.

SUMMARY

1. A new procedure in bilateral reconstruction of mandibular condyles, utilizing iliac bone grafts and creation of new joints by means of nonelectrolytic metal is presented. A case is reported (Case 1).

2. A case of bilateral condylectomy of 16 years ago is re-examined. The many present day textbooks which cite this case as one in which there is no retrusive open bite deformity following condylectomy should be corrected by this report. In the years following the original publication, the patient has become a dental cripple (Case 2).

3. Surgeons should carefully follow their cases of condylectomy over the years and not assume that the immediate satisfactory results are permanent.

4. Condylectomy is not a surgical procedure to be used for the correction of prognathism or ankylosis.

18. Pryor, W. J. Personal communication.
19. House, M. M. Personal communication.
20. McCollum, B. B. Personal communication.
21. Boucher, Carl. Personal communication.
22. Sicher, Harry. Personal communication.

FIXED BRIDGEWORK WITH UNIVERSAL MOVEMENT

By Robert W. Joffee, D.D.S., Chicago, and Norman R. Joffee, D.D.S., Highland Park, Ill.

The ideal bridge should provide the patient with maximum service with a minimum amount of inconvenience, a minimum amount of tooth wear and also allow an optimal amount of movement to the abutment teeth.

Following is a brief description of a fixed bridge which meets these provisions. Although the bridge is firmly cemented in place, the pontics and the abutment teeth move freely in function. Masticatory stress is transferred without distortion through the abutment teeth to the periodontium and supporting bone. The pontic, acting as a stress-breaker, is tissue-borne, enabling the mucosa to carry its share of the masticatory load. This movable type of fixed bridge enables the abutment teeth to retain their mobility and provides the pontics with sufficient movement to stimulate the mucosa which helps maintain that tissue in a healthy condition.

As in the construction of any type of major restoration, a thorough examination of the mouth, including roentgenograms and study models, must be made. From this examination the operator determines which teeth should be retained, which should be employed for abutment purposes and the type of abutment attachment to be used: cast gold crown, cast gold jacket crown, three-quarter crown or an inlay.

The attachment patterns are then prepared in wax in the usual manner, cast, fitted to the abutment teeth, examined for adaptation, occlusion and contact and, if satisfactory, polished. They are then replaced on the abutment teeth and a wax bite and impressions of the upper and lower teeth taken. Stone models are made of the impressions and mounted on an articulator. The models are examined to determine whether long pin facings or Steel's facings are to be used. The facings are selected, ground to fit and held in position with sticky wax. A plaster counter die is then made of the pontic facings in position. Assuming that long pin facings are to be used a porcelain saddle is baked on the gingival portion of the facings (Fig. 1, left).

A small rectangular-shaped lug or key[1] about 1.5 mm. in width, 3 mm. in height and 9 mm. in length is attached by sticky wax to the distal surface of the anterior abutment and to the mesial surface of the posterior abutment. Care must be taken in the lining up of these extension lugs or keys in order to be sure that they freely clear the porcelain facings and pins and that ample room is allowed for the gold casting. Also the occlusal surface of the lugs or keys should be placed at least two mm. gingival to the occlusal surface of the pontic in order to provide ample strength for the key-way portion of the attachment (Fig. 1, right).

1. Ney's distal extension rectangular box and shaft or I. Stern and Co.'s McCollum attachment.

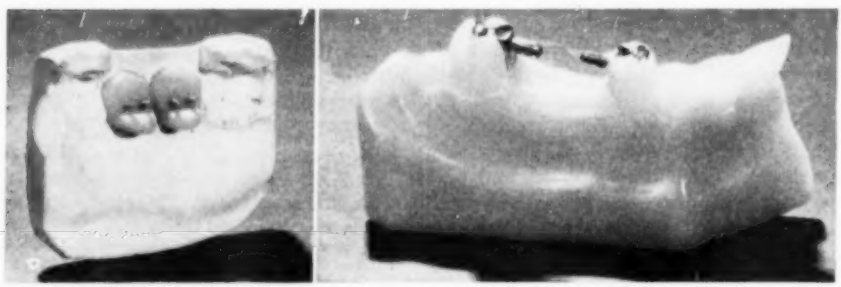


Fig. 1 • Left: Long pin facings with attached porcelain saddles. Right: Key attachments

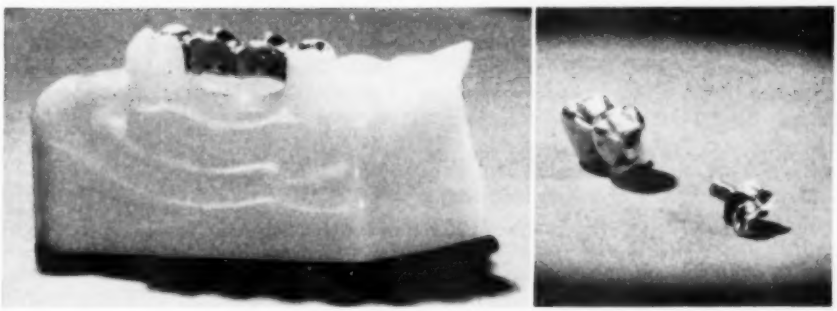


Fig. 2 • Left: Pontics carved in wax. Right: Abutment attachment with key; pontic with keyway

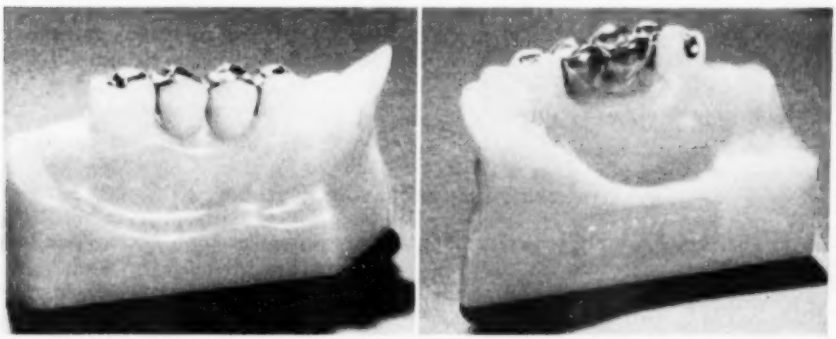


Fig. 3 • Completed bridge. Left: Buccal view. Right: Lingual view

The attachments with the lugs or keys waxed in place are removed and invested. The sticky wax is boiled out and the keys soldered to the attachments. Additional strength can be provided the key if a slight shoulder or recess is cut into the abutment attachment and the key inserted in it before it is waxed in position and soldered. The abutment attachments are then placed on the articulated model. The facings are replaced in the counter die and set in position on the model and the pontic tooth forms carved in wax (Fig. 2).

The pin facings are removed and carbon points inserted in the pinholes. The carbon points are covered carefully and sufficiently with investment plaster which is allowed to set thoroughly. The wax pattern is then removed with the attachment pieces in place. The attachment pieces are removed from the wax pattern by withdrawing the keys from the keyways in the pattern. Carbon points are inserted into the keyways in the pattern. The wax pattern is then invested and the investment plaster allowed to set. The wax is then burned out and the gold pontics pickled and polished.

When assembled and cemented in place, this type of movable-fixed bridgework (Fig. 3) provides the patient with an appliance that combines the best qualities of the fixed and of the removable type of restoration.

55 East Washington Street

BUREAU OF LIBRARY AND INDEXING SERVICE

1952 nomenclature conference

At the close of the nomenclature conference held on June 20 and 21, 1952, a committee of participants was named to prepare a detailed digest of the proceedings. This digest proved to be too extensive for publication in THE JOURNAL; and therefore the chairman of the conference, George B. Denton, has written the following summary of the discussions of the second day to present the salient points of the meeting. No attempt has been made to analyze or evaluate the papers presented, since it is expected that several of these papers will be published in professional journals. Abstracts of these papers appear in the complete report of the conference, which is available in mimeographed form to participants and to other interested persons.

CONCEPTS PERTAINING TO OCCLUSION

At the 1952 nomenclature conference the 30 participants succeeded in clarifying the different points of view and offered definitions of various concepts pertaining to occlusion. The aims and methods of the conference had already been outlined in bulletins issued before the conference, and the program of the conference followed closely the proposed plans.

Because it was felt that differences of opinion on the subject of occlusion extended to disagreement even as to facts and concepts, it had been decided previously to consider the concepts of occlusion rather than the terms which stood for the concepts. If agreement could be reached as to the definition of the occlusal concepts themselves, the problem of naming these concepts would be less difficult. Defining concepts and disregarding terminology, adopted as the procedure for the conference, was a new feature in nomenclature technic.

The program of the first day was devoted to prepared papers and discussions dealing with concepts of occlusion as they enter into the thinking and work of the various departments of dentistry. In order to provide background material and perspective, A. A. Dahlberg and Harry Sicher of Chicago dealt with occlusion from the viewpoint of comparative anatomy and anthropology. T. M. Graber of Chicago and T. D. Speidel of Minneapolis presented the historical development and critical analysis of the concepts as they pertain to orthodontics. Carl O. Boucher of Columbus, Ohio, O. M. Dresen of Milwaukee and L. W. Thom of Minneapolis dealt with the concepts of occlusion in prosthodontics. P. E. Boyle of Philadelphia and M. K. Hine of Indianapolis discussed occlusion as it pertains to periodontal conditions. O. H. Stuteville of Evanston, Illinois, and J. H. Johnson of Toronto considered the topic of the temporomandibular joint relations of occlusion.

The second day of the conference was devoted to the general discussion of con-

cepts of occlusion and their definitions. A number of questions arose as to the scope of the subject under consideration. The second preliminary bulletin had proposed:

> At the conference it is planned to interpret the general concept of occlusion in its broadest signification. It will therefore be understood to cover all phenomena relative to closure and opening of the jaws. These phenomena will include mastication, speech, deglutition and some non-functional activities of the stomatognathic system. For purposes of description, these activities will be analyzed into structural relations, physiologic movements, critical positions of anatomic structures in motion, as well as the applications of muscular force in amount and direction.

It was generally agreed at the conference that both stationary and moving phenomena should be considered, irrespective of the applicability of such terms as "occlusion" and "articulation." There were two points of view as to the way in which the anatomical complex involved in occlusion should be regarded. The term *stomatognathic system,* a concept limited to structure, was suggested; but the term *masticatory system,* a concept expressing function, was adopted. Although the participants felt that only concepts referring to function should be discussed, finally all phenomena of which the involved structures are normally capable were accepted as within the scope of the investigation. There was some discussion as to whether types of occlusion should be defined only in their normative meaning or also in their generic unevaluated significance. Most concepts were regarded from a normative point of view as either "harmonious" or "disharmonious," although on this point the participants were not entirely consistent.

Rest Position • It was generally agreed that rest position of the mandible should be regarded as the primary and fundamental position, since it is the position to which the mandible returns from any other functional or voluntary position or movement of the mandible when function has ceased. After some discussion, in which various qualifying conditions were ascribed to rest position, it was agreed that the concept of rest position was sufficiently defined as "the position the mandible assumes in rest in a tonal contraction of the musculature without outside interference." The position of the condyle in the temporomandibular articulation and the distance between the upper and lower teeth or between the maxilla and mandible, although previously mentioned, were omitted from the concept agreed upon.

The attention of the conference was called to the fact that rest position varies somewhat with the position of the body. Rest position as contemplated in this conference was identified with the upright position of the torso and the erect position of the head (orthostatic rest position).

Occlusal Position • The general concept defined as "any position with the opposing teeth in contact" was designated as occlusal position. It was recognized that the number of teeth in contact and the character of the teeth, whether natural or artificial, were immaterial to the generic (non-normative) concept.

Median and Peripheral Occlusal Positions • Six critical contact positions were recognized, but there was a general feeling that the usual division into centric and eccentric positions was unsatisfactory, particularly because of controversial differences over the concept termed *centric.* To avoid misunderstanding, *median occlusion* was distinguished from the concept *peripheral occlusion,* including the lateral and anteroposterior positions.

Harmonious and Disharmonious Variants • Each of the six types of occlusal position was regarded as having harmonious

and disharmonious variants. Thus, the equivalent of what is commonly designated as centric occlusion becomes harmonious median occlusion. Positions were regarded as harmonious when all of the involved components are in harmony. In the words of one of the participants,

> If not all of the structures, teeth, jaw, muscles, are in harmony, then it is a disharmonious position, and this disharmony may be caused by cuspid or lateral interference, by forward or backward displacement, or by overclosure. . . . If dentures have caused resorption of the process, the occlusal position will not be harmonious because the muscles will be overcontracted.

Components of Occlusion • Attempts to define occlusal position gave rise to the question: "What are the components of occlusion?" Three general components were accepted without question; namely, (1) the stresses and strains of the musculature by means of which the mouth is opened and closed, (2) the structures of the temporomandibular joint, especially as they concern the positions and movements of the parts and the strains and pressures to which the structures may be subject and (3) the relations of the teeth and their cusps when brought into occlusal contact. The question was raised as to whether a fourth component also should not be recognized as a resistance factor, especially as regards the supporting structures of the teeth when subject to occlusal stress and as regards the gingival covering of the alveolar process when subject to the pressure of denture bases. It was pointed out that this factor of resistance to muscular stresses is recognized in the prosthodontic and periodontic fields but is generally not taken into consideration in orthodontics.

Median Positions • The median positions of the mandible were given particular attention. Three positions oriented to the median sagittal plane, as is rest position, were classified as median positions. These were rest position, median occlusal position and terminal, or full, open mouth position. The path of the mandible in opening from median occlusal position to full mouth opening passes through all median open mouth positions, and all of these positions are in median relation.

Median Occlusal Position and Median Relation • With regard to median occlusal position, the conclusion arrived at by the prosthodontists participating was that "harmonious median occlusion provides optimum relations of the teeth with each other and with all structures involved in the median jaw position" and, conversely, that "disharmonious median occlusion has tooth relationships which are not in harmony with each other or with the structures involved with median jaw position." The assumption in the latter conclusion is that any disharmony in median occlusion is due to the teeth and that median relation is of necessity a harmonious relation. From the point of view of other participants in the conference, however, median relation may be either harmonious or disharmonious and therefore even though the median occlusion may be said to be in median relation, it may have disharmonies of the temporomandibular joint or of the musculature as well as of the tooth contacts. Of course, if the prosthodontist establishes a harmonious median relation, he can adapt the artificial teeth to contact in harmonious relation.

In the discussion of edentulousness, two questions arose: (1) May not the position where the teeth of the prosthesis will come into median occlusion when supplied be considered as a potential occlusal position in the absence of the restoration (the median relation of potential median occlusion)? (2) When the jaws are edentulous as in infancy and in senescence and the gum pads are brought together in the anterior region, may not this position also be regarded

as a kind of median occlusal position to be distinguished from positions where there is occlusion of the teeth? The participants of the conference were inclined to accept any interposed substitute for the teeth as sufficient to warrant its inclusion within the concept of median occlusion; but the concept of actual contact of the gum pads was regarded, for the most part, as not useful as a concept and therefore negligible. No attempt was made to fix a norm for the position at which the contact of the teeth should occur in median occlusal position.

The concept median occlusion (or median occlusal position) was defined as "the contact or contacts of the teeth of the opposing jaws when the jaws are in median relation." This definition left open the question as to whether any disharmony of the median occlusal position must necessarily be due to the contacts of the teeth, the answer depending on whether the concept of median relation may be regarded as either harmonious or disharmonious.

Median Open Mouth Positions • The full open mouth position was defined as "the position that the mandible assumes in maximum opening." The factors that determine the maximal opening were detailed as "the strain or stretch of the so-called cheek ligaments, the capsule as a whole and especially the temporomandibular ligament, on the outside, the stretching of the skin, muscles and other soft tissues, and the compressing of other tissues." The concept of intermediate open mouth positions between rest position and maximal open mouth position, although not subject to specific determination, was regarded by some participants as a useful concept. These positions were referred to as median free open positions. There are also peripheral free open positions.

Hinge Opening Position • The position of the condyle in the temporomandibular joint from which an opening by hinge movement is possible beyond the amplitude of rest position was defined as hinge opening position. The position is the most retruded position of which the condyle is capable. The conditioned movement voluntarily achieved from this position was defined because, although nonfunctional, it is employed by certain prosthodontists in the construction of dentures.

Other Occlusal Concepts • Various other occlusal concepts were discussed incidentally at the conference. The definitions of these concepts as well as those definitions already discussed in this report were framed by participants during discussion and consequently, it must be understood, were not always in perfect form. No official terminology was adopted for the conference, and the conclusions arrived at were not regarded as authoritative.

1953 nomenclature conference

Participants in the conference on concepts of occlusion expressed satisfaction with the results of their discussions; and consequently the Board of Trustees authorized another nomenclature conference for 1953, which is tentatively scheduled for June 10 and 11. The subject of this conference will be "Supplementing the Dental Dictionary"; it will deal with the dental vocabulary that has come into existence since 1936, when the latest dental dictionary was published.

The American Dental Association Film Library

The following films have been added to the American Dental Association Film Library and are now available to dental societies, study clubs and dental schools. One of them, "Good Dentistry Can Improve Your Appearance," is suitable for community and civic groups. Since the number of prints of each title is necessarily limited, it is suggested that program chairmen of dental societies and study clubs plan their programs far enough in advance to insure availability.

SLIDES

The Association also circulates 2 by 2 slides which can be used in a 35 mm. slide projector. The subjects covered are dental health, periodontics and oral pathology. Many additional sets of slides are needed on such subjects as: operative dentistry, exodontics, oral surgery, pulp canal therapy, and denture construction. For example, a series of slides on denture construction tracing the steps involved from the initial visit of the patient to the insertion of dentures could be used as a teaching device to supplement the technics illustrated in the films reviewed in this article. If any readers have such a collection of slides, with accompanying explanatory material, it will be appreciated if they are loaned to the Film Library for selection and duplication. If they are used, proper credit will be given.

FILM REVIEWS

Good Dentistry Can Improve Your Appearance • 16 mm., color, silent, 800 feet, showing time 20 minutes. Produced in 1949 with revisions in 1952 by Gabriel R. Vogelson, D.D.S. Photography by Alvin Taylor. Procurable on loan ($2.50) from the American Dental Association Film Library, 222 E. Superior St., Chicago 11.

The purpose of this film, according to its producer, is "to show a phase of restorative dentistry which corrects facial and dental disfigurement caused by deterioration of teeth." A series of "before and after" examples of patients with anterior restorations is presented. The restorations range from immediate denture service to different types of fixed bridgework. Through the examples presented, the scope and importance of good dentistry is transmitted to the viewer. The photography is good. All the intraoral shots are clear. Although this is a silent film, the legends make it self-explanatory. This is suitable for use as an introduction to a course on restorative dentistry, or by general practitioners in a program on the education of patients. It is also good public relations material for the dental profession and as such is suitable for community and civic groups, dental societies and study clubs.

The Centrimetric System for Denture Construction • 16 mm., color, sound, 1,600 feet, showing time 40 minutes. Produced in 1951 by Harry L. Coleman for the Durallium Products Corporation and Opotow Dental Manufacturing Corporation. Procurable on loan ($2.50) from the American Dental Association Film Library, 222 E. Superior St., Chicago 11, or on loan or purchase from the Opotow Dental Manufacturing Co., 469 President St., Brooklyn 15.

This film demonstrates the technic involved in the use of the centrimetric system for constructing dentures. The steps covered are the recording of the vertical relation, centric relation, and the balancing of occlusion through the use of the "centrecord" and "centrecheck." The "centrecord," an appliance with springs in the molar area, is used to keep the bases in position on the ridges and to balance the forces of occlusion during registration. The "centrecheck," a sponge rubber cushion, set with plaster in the upper denture vault, keeps the dentures seated during the process of marking interferences, thereby eliminating inaccuracies. This film is well organized and presented. The chair and laboratory procedures are clearly illustrated. The photography is good, enabling the viewer to see all the operations clearly. It is suitable for teaching dental students and can be used either as an introduction or as a review in a course on denture construction. Dental societies and study clubs may also find it interesting program material.

Preparation of the Mouth for Dentures • 16 mm., color, silent, 1,100 ft., showing time 33 minutes. Produced in 1951 by the Division of Oral Surgery of the University of Minnesota School of Dentistry. Surgery by Henry B. Clark, Jr., M.D., D.D.S., and Mellor R. Holland, D.D.S., M.S.D. Photography by James H. Rothenberger. Procurable on loan ($2.50) from the American Dental Association Film Library, 222 E. Superior St., Chicago 11, or on loan or purchase from the University of Minnesota School of Dentistry.

According to the producer, "this film was made to demonstrate some of the surgical procedures needed to put mouths in proper condition for the reception of artificial dentures. All operations to be shown can be performed by the general practitioner in his office, providing that proper facilities and assistance are available." The first example shows the steps involved in the removal of teeth and the performance of an alveolectomy which involves the upper labial region preparatory to the insertion of an immediate upper denture. The second shows the smoothing of the alveolar bone and the removal of mandibular tori, bony spines and undercuts. The other examples illustrate surgical technics for reduction of hyperostosis of the maxillary tuberosities, for removal of a tumor, and for the reduction of a torus palatinus. This is a well-organized film. Although it is silent, the legends make it self-explanatory. All of the examples are presented with preoperative and postoperative roentgenograms. The photography is good, enabling the viewer to see all the intraoral shots clearly. It is suitable for teaching purposes for postgraduate dental students. It may be used as an introduction to a course on denture construction or in an oral surgery course. General practitioners, oral surgeons and prosthodontists also may find it interesting. It may be used on dental society and study club programs to stimulate discussion on the technics illustrated.

BUREAU OF ECONOMIC RESEARCH AND STATISTICS

Distribution of dentists in 1952

The 1953 edition of the *American Dental Directory* provides the basis for a study of the distribution of dentists. This *Directory*, which includes information received up to June 15, 1952, lists 91,638 dentists in the United States, including 84,215 listed by state and 7,423 in the federal dental services. The 1952 graduates are included. This total includes not only active dentists but dentists who are retired or who have entered other occupations. In other words, it includes, insofar as it has been possible to gather the information, the names of all living dentists in the United States, its territories and possessions.

Of the total of 91,638 dentists, the Bureau estimates that approximately 82,000 are active in some phase of the dental profession and that some 78,000 are practicing; that is, actually work at the chair. Although these estimates are based on the best available evidence, they should be considered tentative. When the 1950 census count of dentists is published, it is possible that these estimates will be revised.

The *American Dental Directory* which was published in the fall of 1950 listed 84,301 dentists by state and 2,575 dentists in the federal dental services. The 1950 *Directory* included graduates of the class of 1949 but not 1950 graduates. Previous issues of the *Directory* have been less complete than the 1953 edition. It is interesting to note that despite the increase of 4,762 dentists listed, there was actually a decrease in the number of

Table • Distribution of dentists in the United States and its territories and possessions

Region and state	Number of dentists	Population per dentist	Estimated population
New England	6,184	1,540	9,523,100
Connecticut	1,484	1,391	2,064,000
Maine	423	2,190	926,200
Massachusetts	3,351	1,429	4,788,000
New Hampshire	266	2,042	543,100
Rhode Island	490	1,670	818,400
Vermont	170	2,255	383,400
Middle East	25,574	1,425	36,441,700
Delaware	144	2,288	329,400
District of Columbia	755	1,098	829,300
Maryland	932	2,596	2,419,100
New Jersey	3,299	1,507	4,972,400
New York	13,365	1,135	15,163,900
Pennsylvania	6,421	1,664	10,687,200
West Virginia	658	3,101	2,040,400
Southeast	9,428	3,468	32,695,800
Alabama	768	4,070	3,125,700
Arkansas	479	4,030	1,930,200
Florida	1,335	2,192	2,926,700
Georgia	879	4,047	3,557,000
Kentucky	937	3,227	3,023,700
Louisiana	1,009	2,728	2,752,300
Mississippi	484	4,557	2,205,400
North Carolina	1,042	4,019	4,188,200
South Carolina	398	5,477	2,179,900
Tennessee	1,103	3,057	3,372,400
Virginia	994	3,455	3,434,300
Southwest	3,760	3,116	11,717,100
Arizona	262	3,042	797,100
New Mexico	184	3,852	708,800
Oklahoma	808	2,788	2,252,400
Texas	2,506	3,176	7,958,800
Central	24,677	1,659	40,928,700
Illinois	6,194	1,437	8,903,000
Indiana	2,028	1,994	4,044,600
Iowa	1,635	1,627	2,659,800
Michigan	3,411	1,932	6,590,300
Minnesota	2,260	1,344	3,038,000
Missouri	2,476	1,626	4,027,200
Ohio	4,216	1,936	8,160,200
Wisconsin	2,457	1,427	3,505,600
Northwest	4,372	1,864	8,147,400
Colorado	774	1,762	1,364,000
Idaho	249	2,424	603,700
Kansas	965	2,008	1,937,800
Montana	302	1,990	601,100
Nebraska	952	1,406	1,338,600
North Dakota	281	2,223	624,600
South Dakota	294	2,245	660,100
Utah	406	1,768	718,000
Wyoming	149	2,010	299,500
Far West	10,220	1,514	15,472,800
California	7,490	1,497	11,211,300
Nevada	86	1,986	170,800
Oregon	1,098	1,455	1,597,700
Washington	1,546	1,613	2,493,000
Total number listed by state	84,215		

Federal Dental Services	7,423		
Air Force	1,790		
Army	2,595		
Navy	1,762		
Public Health Service	290		
Veterans Administration	986		
United States	91,638	1,691	154,926,600
Territories and possessions	588	4,918	2,891,962
Alaska	40	3,216	128,643
Hawaii	282	1,772	499,794
Panama Canal Zone	12	4,402	52,822
Puerto Rico	254	8,704	2,210,703

Sources: Number of dentists is based on a count of dentists listed in the 1953 American Dental Directory. Populations of states and regions are estimates as of January 1, 1952, from Sales Management, May 10, 1952. These estimates are copyrighted by Sales Management and are included through the courtesy of that magazine. Populations of territories and possessions are as of April 1, 1950. Populations of Alaska, Hawaii and Puerto Rico are from 1950 Census of Population, Advance Reports, Series PC-11, No. 1, Bureau of the Census, December 5, 1950. Population of Panama Canal Zone is from the same series, No. 2, February 14, 1951.

dentists listed by state. The number of dentists listed in federal dental services increased by 4,848.

It will be noted from the table, "Distribution of Dentists in the United States and Its Territories and Possessions," that the population per dentist varies greatly from state to state and from region to region. In South Carolina the population per dentist (5,477) is almost five times as great as it is in New York (1,135). Within regions, however, the state ratios are fairly consistent. There are some exceptions, but most of these can be explained by the way in which states were grouped into regions. For example, Maine, New Hampshire and Vermont have population-dentist ratios considerably larger than the average for the region, but these three states are at the north end of the region, out of the heavy industrial-commercial part of New England. Similarly, the three states in the Middle East with larger population-dentist ratios, Delaware, Maryland and West Virginia, are close to the Southeast region, which has high ratios.

In general, it may be said that the Eastern and Far Western sections of the country are best supplied with dentists, and the South has the fewest dentists in relation to the population. Other sections fall between the two extremes.

In comparing state and regional ratios with the national ratio, it must be borne in mind that dentists in the federal dental services are included in the national total but not in the state totals. Military personnel are included in the state population figures. In the armed services the ratio is approximately one dentist per 500 servicemen.

The decision to use population estimates published by *Sales Management* was made because the research department of that magazine makes county population estimates each year. Census figures become obsolete between decennial years. The county figures are used in the booklet, *Distribution of Dentists in the United States, by State, Region, District and County,* which may be obtained from the Bureau on request.

B. Duane Moen, Director

COUNCIL ON DENTAL THERAPEUTICS

Council announces classification of additional products

The classification of products by the Council on Dental Therapeutics has been described in a previous report (*J.A.D.A.* 40:489 April, 1950). The Council's program now provides for classification of products in Group A, Group B, Group C and Group D. Products are reconsidered periodically, and decisions are subject to change at any time that a substantial amount of new evidence becomes available. The files of the Council contain information on many drugs and dental cosmetics, and inquiries are welcome.

GROUP A

Listing of products in Group A means that at the time of their consideration, the items conformed with the provisions for acceptance established by the Council on Dental Therapeutics and adopted by the Board of Trustees and the House of Delegates of the American Dental Association. Items in this group will be listed in *Accepted Dental Remedies* and may use the Seal of Acceptance, unless otherwise provided.

The following additional products are classified in Group A:

Lidocaine (See *Accepted Dental Remedies* 1953, p. 23.)

Xylocaine Ointment, 5% (Astra Pharmaceutical Products, Inc.): A topical anesthetic, each 100 Gm. of which is stated to contain lidocaine (base), 5 Gm., in an ointment consisting of polyethylene glycol 1,500, N.N.R., polyethylene glycol 4,000, U.S.P., and propylene glycol, U.S.P.

GROUP B

Listing of products in Group B means that there is insufficient evidence to justify their present acceptance, but there is reasonable evidence of their usefulness and safety. These products meet the other qualifications and standards established by the Council on Dental Therapeutics and the Division of Chemistry. It is the Council's opinion that Group B products may be promoted for special use and study.

GROUP C

Listing of products in Group C means that the evidence is so limited or inconclusive that the products cannot be accurately evaluated. It is the Council's opinion that Group C products require further study by qualified investigators.

The following additional product is classified in Group C:

Profie (Laclede Laboratories, Inc., St. Louis, Mo.): (For detailed report, see p. 333.)

GROUP D

Listing of products in Group D means that they are unacceptable because of their demonstrated inability to meet the standards outlined in the provisions for acceptance.

The following additional product is classified in Group D:

Heliogen Tablets (Heliogen Products, Inc., Long Island City, New York): (For detailed report, see p. 334.)

Council classifies Profie in Group C

A new product called Profie was submitted by Laclede Laboratories, Inc., for consideration by the Council.

Profie is promoted for use as an adjunct for the removal of supragingival and subgingival calcareous deposits from the teeth. The product consists of (1) a tablet stated to contain abrasives suitable for use in dental prophylaxis and certain enzymes that are alleged to be capable of digesting the organic constituents of calculus, and (2) a special solution in which the tablet is to be dispersed to form a paste.

It is claimed that Profie, when used before scaling as prescribed by the manufacturer, facilitates the removal of calculus more effectively and with less discomfort and trauma to the patient than may otherwise occur, and results in more efficient cleansing of the tooth surface than that which may be expected from the use of ordinary prophylactic adjuncts. Evidence is presented to indicate that Profie does not injure the hard or soft tissues of the mouth when used as directed.

In support of its claims the firm presented a report of a limited clinical study of this product which was performed at a dental school. The report indicated that in 25 of 40 cases, the preparation was considered superior to a placebo tablet identical with Profie but without the enzymes. In six cases, however, the placebo was considered better than Profie, and in nine cases no difference was observed. In the opinion of the Council, this result is inconclusive and does not demonstrate a real difference in effect between Profie and the placebo.

Some of the advertisements for Profie appear to indicate that the product is useful in removing calculus of all types. The Council questions the usefulness of a "softening" agent as an adjunct to instrumentation in the removal of hard calcareous deposits. It is a common clinical observation that hard, brittle calculus often may be removed with great ease as compared with the softer varieties. By way of analogy, hard-set cement may be removed from a glass slab with comparative ease in contrast to the difficulty encountered in removing softer, pastelike material. The Council believes that the usefulness of a "softening" agent as a fundamental consideration in this regard is not yet established.

A representative of the firm has informed the Council office that it was not their intention to claim that Profie aids materially in the removal of hard, superficial deposits of calculus, and indicated that future advertising will be modified to avoid this misunderstanding.

The Council has been further informed that additional laboratory and clinical studies are in progress under the firm's sponsorship with a view to clarification of some of the questionable attributes of the product.

In view of the inconclusive nature of the findings reported in the small-scale clinical investigation and because continuing studies have not yet been completed, the Council has voted to classify Profie in Group C. In conformity with the Council's established policy, this product will be reviewed when adequate additional evidence in support of its alleged usefulness is made available.

Heliogen Tablets classified in Group D

In June, 1952, as a result of inquiries received in the Council office for information on Heliogen Tablets (Brand of Ultraviodine), Heliogen Products, Inc., of Long Island City, N. Y., was invited to submit the product to the Council on Dental Therapeutics. The Council has received from the firm information that was available from limited studies of the product. The firm has indicated that additional studies are in progress, but are not yet complete. The lack of adequate clinical evidence, however, did not deter the firm from engaging in an intensive advertising campaign to the dental profession. The following report is therefore presented for the information of the profession:

Heliogen Tablets were examined in the Division of Chemistry. The product consists of a white, foil-wrapped tablet weighing approximately 0.6 Gm. When dropped into "four ounces of water," in accordance with the manufacturer's instructions, it disintegrates with effervescence, yielding an amber solution containing 25 to 30 mg. of titratable iodine.

According to information received from the manufacturer, each tablet contains chloramine-T, potassium iodide, dextrose, sodium benzoate, sodium bicarbonate, citric acid and saccharin, and is stated to liberate 25 mg. of "nascent" iodine when dissolved, as a result of the reaction between chloramine-T and potassium iodide.

In support of the claims made in promotion of the product, the firm submitted reports purporting to show that the Heliogen solutions emit very feeble ultraviolet radiation, that the product is nontoxic, and that it is a useful therapeutic agent in the treatment of Vincent's infection, gingivitis, pericoronitis, "periodontoclasia," aphthous ulcers, and other oral disease conditions. It is further claimed that "In Heliogen is provided the means for obtaining maximum and immediate remission of infectious conditions, improvement of the general condition of the mucosa and gingival tissues, and the promotion of more rapid healing."

The Council has examined all of the evidence submitted by the firm and has arrived at the following conclusions:

1. No bacteriologic or clinical studies have been reported which might demonstrate that microorganisms are killed by virtue of the feeble radiation said to be emitted by Heliogen solutions, or that such radiation is beneficial to the patient.

2. The evidence for the usefulness of Heliogen in treating Vincent's disease, gingivitis, pericoronitis, "periodontoclasia," aphthous ulcers, "sore throat," "sore gums," and in preoperative and postoperative washing of surgical sites is based on a single investigator's uncontrolled studies which are not regarded as adequate for many reasons. For example:

> A. In the treatment of "Vincent's disease," gingivitis, pericoronitis, and "periodontoclasia," effects were observed only after manipulative periodontal and surgical measures had been carried out. Under those circumstances, successful results frequently are obtained by competent practitioners with the use of physiological saline solution for irrigation and rinsing, or without any adjunctive agents. The criteria by which the diagnosis and progress of the foregoing conditions were assessed were not revealed. Control solutions were not employed for comparison.

B. In the case of its use preoperatively and postoperatively, the report merely states that no complications were encountered in a total of 36 cases. This does not establish usefulness but may indicate that the material is not irritating.

3. In another report which concluded that Heliogen was useful in clearing up infected wounds with free drainage, successful results were also obtained with the use of compound solution of iodine, U.S.P. (strong iodine solution, U.S.P.—Lugol's solution) diluted to give an iodine concentration equivalent to that of the Heliogen solution. The number of cases observed in this study was too small to permit the formation of valid conclusions concerning the possible superiority of Heliogen over the diluted U.S.P. preparation.

4. The term "nascent" iodine as featured in the promotional literature is both incorrect and misleading. The term "nascent" is not observed frequently in the modern chemical literature but may be occasionally employed to designate the character of free radicals which, in the case of chemical elements, would refer to the presumed transitory existence in a state of atomic subdivision of some of those elements which ordinarily exist in a more complex molecular state. The firm cites no evidence to justify the application of the term "nascent" to the iodine formed in the reaction of chloramine-T with potassium iodide. Of greater significance, however, is the unsupported and apparently false concept that the iodine exists in a peculiarly active form at the time the solution would be employed by the dentist. Furthermore, there is no evidence provided to indicate that this hypothetical form of iodine would be of unusual clinical value. This terminology simply serves to confuse the reader.

5. The phrase "Brand of Ultraviodine" implies that Heliogen is the proprietary name for a drug or preparation whose generally recognized generic name is "Ultraviodine." None of the available official or nonofficial compendia contain a listing of "ultraviodine," and the term implies a significance which has not been demonstrated.

The Council concludes that one Heliogen tablet dissolved in four ounces of water provides merely a weak solution of iodine (approximately 1:4,800), rendered unnecessarily complex by the presence of the products of the bicarbonate-citric acid reaction, the decomposed chloramine-T, sodium benzoate and glucose. A solution containing free iodine at comparable concentration may be prepared conveniently in the office by diluting one volume of strong iodine solution, U.S.P. with 250 volumes of water.

In consideration of the foregoing observations, the Council has classified Heliogen Tablets in Group D. The product may be reviewed at any time when sufficient new evidence becomes available.

MARCH 1953

LON W. MORREY, D.D.S., EDITOR
VOLUME 46 • NUMBER 3
Published by the American Dental Association
222 East Superior Street • Chicago 11, Illinois

THE Journal OF THE AMERICAN DENTAL ASSOCIATION

Editorials

The curse of carelessness

For those who would keep abreast of the times the financial section of the newspapers during the first weeks of a new year offers many items of interest. Steel tonnage sets a new record—Automobile industry hits new high—Soft coal output up—Corn crop largest in history. Such headlines make an American proud to be an American. But sometimes, in some years, other records, less wholesome, are broken—records of which thoughtful citizens are less proud.

Nineteen fifty-two was such a year.

During the past twelve months American tobacco factories, it is reported, produced 430 billion cigarettes—a record high—and 4 per cent more than the 412 billions produced in 1951. The incidence of lung cancer is rapidly rising, according to the American Cancer Society.[1] Although medical authorities differ as to the relationship between smoking and carcinoma of the lungs, many researchers look on the habit as a causative factor.[2]

Nine billion dollars, equal to three quarters of the federal nonmilitary budget, was spent last year by the sixty-five million persons who make up America's drinking public. This astronomical sum purchased 175 million gallons of hard liquor and about two and one-half billion gallons of beer. Alcoholism—as much an illness as any other physiologic disorder—is an increasing problem. Excessive drinking costs the American public almost one and one-half billion dollars per year and accounts for more than 6 per cent of all automobile accidents.

Thirty-eight thousand deaths and 1,330,000 injuries resulted from auto accidents in 1952, according to National Safety Council estimates. More than 80 per cent of these costly and incapacitating disasters might have been prevented, for it is known that in every 100 fatal automobile accidents, 83 of the drivers have violated some traffic regulation.

Plain, ugly gluttony takes its toll of human health. During the past ten years obesity has displaced vitamin deficiency as the country's number one nutrition disorder. Some 25 million overweight Americans, of whom at least five million adults are seriously obese, constitute the nation's top health problem. Obesity contributes to diseases of the heart, arteries and kidneys, to diabetes and to certain disorders of the liver, biliary tract and intestines. According to insurance statisticians, for persons who have been charged extra premiums on life insurance because of overweight, the death rate is 50 per cent higher than for normal risks.

Since 1935—for seventeen long years—some of the leading public health, welfare and civic authorities have racked their brains to devise a nationwide plan that would care for all the health needs of all the people. The President's Commission on the Health Needs of the Nation, which recently reported, is such an attempt. To date no such plan has been developed—nor can it ever be developed on a wholesale basis—because the problem is overwhelming. Isn't it about time that the over-all problems of ill health should be broken down into segments and that each segment should be attacked separately?

Surely much of the physical suffering, mental anguish and financial drain caused by disregard of common sense in eating, drinking, smoking and driving could be eliminated, or at least greatly reduced, by an intelligent, hard-hitting educational program financed either through private or public funds or both.

1. The Cancer Bulletin, Illinois edition 4:132 Nov.-Dec. 1952.
2. Doll, R., and Hill, A. B. A study of the aetiology of carcinoma of the lung. Brit. M. J. Dec. 13, 1952, p. 1271.

Review of deferred dentists confounds confusion

Although a new bill is now being prepared to replace Public Law 779, it will be at least early summer before it becomes effective. In the meantime the action taken late in December by the Department of Defense in lowering the physical requirements for dentists, physicians and veterinarians has caused additional confusion among the younger members of the health professions. Many dentists who were deferred originally because of some physical disability now find themselves suddenly acceptable to the Armed Forces.

Under the recent ruling the physical examination records on file at the Army Surgeon's office are being screened in the light of the new physical qualification standards. If the record discloses that a dentist has been deferred because of a defect which is no longer considered disqualifying, the dentist's local registration board is notified and the registrant is reclassified as 1-A without further physical examination. In borderline cases the registrant is ordered to take a new physical examination to determine his eligibility. Reclassified registrants may request a new physical examination. In order to increase the health service resources further, Selective Service has

ordered a review of all deferred dentists and physicians including those who claim deferment because of dependency or essentiality.

When a registrant in Priority I or II is reclassified in 1-A, his local registration board must order him included with the next group of inductees called. Consequently, some dentists are receiving notice of their changed classification in one mail and induction orders in the next—hence the heightening confusion. The law provides that registrants are entitled to a review and an appeal of their classification. Therefore, if the time allowed prior to induction is short and the dentist needs time to put his personal affairs in order, he should present his position to his local board and seek an extension. Such extension, if reasonable, usually is granted. The main point is that many Priority I and Priority II dentists who originally were granted deferred classifications have been reclassified and soon will be ordered to duty. It behooves them to be aware of their new status and to act accordingly so that they may put their personal affairs in shape and care for their family interests to the fullest extent possible before assuming their military obligations.

Dentists assist in American Dental Assistants campaign for new members

It is now estimated that there are not less than 55,000 dental assistants employed in the United States. This figure focuses attention on an interesting and productive membership campaign currently conducted by the American Dental Assistants Association.

Last July, aided by the Bureau of Public Information of the American Dental Association, the membership committee of the dental assistants' national organization mailed a return survey card to each member of the American Dental Association asking whether his assistant was a member of her national association and, if not, offering a year's free subscription to the dental assistants' publication. More than 11,000 replies were received from nonmembers denoting interest in membership and copies of the publication. Prompt follow-up by the membership committee has resulted in a gratifying influx of new members. Many assistants, however, still remain unaffiliated with their national and local organizations. It is suggested that the dental employers of these nonmembers acquaint them with the advantages of association affiliation.

Dentists, realizing the importance of membership in their local, state and national associations, are in an excellent position to counsel their assistants and to point out the values that will accrue, not only to the assistant herself, but to the patients, the dental office and to the entire profession with which she is affiliated, through her membership in her national organization.

A few words of friendly advice from dentist to assistant which will motivate her to join with her sister auxiliaries will help immeasurably to raise the level of education, efficiency and loyalty of this great and growing group of indispensable dental aides and both directly and indirectly improve the standards of dental service in the community.

First-aid for dentists

R. W. Bunting, D.D.S., Washington, D. C.

Civil defense is a challenge to dentists. If, in the event of a national disaster, dentists are expected to step outside their usual professional boundaries and cooperate with physicians in the care of all types of body injuries, they should be prepared to meet these responsibilities. They should learn the methods of casualty care and what they, as dentists, can do to relieve suffering and save lives.

The general scope of this training is outlined in *The Role of Dentistry in Civil Defense and Courses in Training for Dentists in the Medical Aspects of Atomic Warfare*, a brochure issued by the Federal Civil Defense Administration. The basis of this training and the initial step is the Red Cross first-aid training course.

To many dentists first-aid training is not very attractive. It is too suggestive of courses given to Boy Scouts and housewives, far below the professional level. Many dentists have enrolled in such classes and have been bored by the elementary instruction which is required for those who have little or no knowledge of human anatomy and physiology. They point out that physicians are not expected to take it and dentists resent their being asked to do so.

The fact remains that the Red Cross first-aid training has much specific information on emergency casualty care that is of great value to anyone. Every dentist should have it, and many physicians need it equally as much. How many dentists know how to control excessive hemorrhage under emergency field conditions? How many know what to do for severe burns? How many know how to transport persons with back injuries to the hospital without doing the patient more harm than the initial injury? How many can perform the Holger-Nielson method of resuscitation? How many know what to do for radiation injuries? These emergency relief measures are well taught in the Red Cross course.

Many have said that the course is longer than is required by dentists, nurses, pharmacists, veterinarians and other health workers. It is true that the material given in the standard 22-hour course could be offered in a much shorter time by the lecture method, but such instruction has little meaning. Unless the participants actually perform the technics employed, it will not be an effective instruction. One must have actual experience in resuscitation, in finding circulatory pressure points, in applying bandages and splints, and in the transportation of seriously injured people in order to be competent in casualty care. This takes time.

A first-aid course specially designed for dentists would be welcomed. In a conference with American Red Cross officials in Washington, the writer, in discussing this question, found that the Red Cross is willing and ready to meet the needs of

Dental consultant, Federal Civil Defense Administration.

dentistry. From the conference came the agreement that the full basic course of 22 hours should be given, but that such course should be limited to dentists only, or to those who have equal professional preparation. Further, the instructor for such courses, if possible, should be a professional man who is qualified to teach such a group. Under these conditions, such instruction would be pointed toward the specific needs of the professional group, all unnecessary details would be eliminated, and the class would obtain the greatest benefit.

At the conclusion of such a course, anyone who completed it satisfactorily would receive a certificate or card indicating that he is duly qualified as a first-aid worker.

Later, in the first-aid stations, dentists will cooperate with and assist the medical staff. Here they will be duly assigned and authorized to perform remedial measures for all types of bodily injury as a part of civil defense rescue services. For this they must know *more* about the care of severe burns, the control of hemorrhage, venipuncture and blood transfusion, and other casualty services. For this they should have additional training as outlined by the Federal Civil Defense Administration. But the first step is first aid.

Many dental societies in various parts of the country now participate, as groups, in Red Cross first-aid courses. This type of project should be adopted by every dental society in the land. All that is required is that the Civil Defense Committee of each Society apply to the local Red Cross headquarters for such instruction. There, qualified professional instructors will be provided and classes for dentists will be organized. The time of the class periods can be arranged by the participants. The basic course will require not more than two evenings a week for one month, or one a week for eight weeks. It has been found that such courses are most interesting as well as instructive. Those who take the course and qualify are well prepared to give efficient first-aid relief in any peace or wartime disaster.

With a short additional instructor training course, dentists may be qualified as teachers of first aid. Then they may conduct Red Cross training classes for both professional and nonprofessional people. In the preparation for an emergency, such teaching personnel will be extremely valuable.

The knowledge that one is prepared and able to render a valuable service to his fellow man at the time of any emergency brings great satisfaction. For those who ask "What shall we as dentists do to prepare for civil defense?" this is the first and most immediate answer.

Washington News Letter

President Eisenhower, acting through the Department of Defense, has asked Congress for renewal of authority to induct physicians and dentists into the Armed Forces. By itself, this is a vitally important question; yet the matter assumes still broader significance because both the executive and legislative branches of the federal government are now beginning to examine the military's medical and dental personnel requirements against the complete background.

By the voluntary method alone, the Army, Navy and Air Forces cannot procure the medical and dental officers which they say they must have. A doctor-draft law is enacted. Administration of this act works hardships to some civilian communities, the faculties of many professional schools and a number of public health departments, not to mention inconveniences suffered by the "draftees" themselves. Attention is focused more sharply on the myriad problems raised by this radical step of singling out a few professions for obligatory military duty. Among these problems are:

Does this country have too few physicians and dentists for adequate coverage of civilian needs and proper staffing of the military establishment?

If the question is simply one of insufficient numbers, does the solution lie in spreading the supply thinner—making the armed forces reduce their ratios still further, cutting down on or even eliminating health services to servicemen's dependents, transferring more professional duties to non- or sub-professional personnel—or does it lie, rather, in taking steps toward increasing the increment of dentists and medical practitioners?

If there is a true shortage, and it is decided to enlarge the supply, should this be accomplished with or without government assistance—by financial aid to the schools or to the students, or both—perhaps by lowering of entrance standards in order to assure a sufficient number of students?

Should something be done, by government fiat or private leadership or some other means, to equalize geographic distribution of practitioners?

These are a few of the basic issues to which Washington is beginning to give serious consideration as a result of the immediate problem at hand; namely, extension of a doctor-draft law that presently is scheduled to expire on June 30, 1953. When the act was passed by Congress in September 1950, soon after outbreak of hostilities in Korea, no attention was paid to anything except creation of some mechanism that would guarantee a military input of physicians, dentists and veterinarians. Today, however, a new Administration and a new Congressional leadership are showing every sign of recognizing the complexities involved and demonstrating their intentions of attacking the problem as a whole.

A symptom of this increasing sense of awareness was displayed a few weeks ago when a member of the House Interstate Commerce Committee suggested that this group join with its sister Armed Services Committee in working out a new doctor-draft law. Interstate normally concerns itself with public health legislation—including plans for aid to professional dental and medical education—while Armed Services deals with matters pertaining to military affairs. Because Congressional committees guard their jurisdictional areas jealously, the Congressman's bold proposal was rejected. Interstate Commerce would look after *civilian* health matters, he was politely informed, while Armed Services would handle the *military* angles.

OTHER CURRENT BILLS

It is the House parliamentarian who decides on referrals of bills to committees. Sometimes it is a coin-flip proposition. In February, for example, Rep. Louis B. Heller (D., N.Y.) introduced H.R. 2718, which would establish a U. S. Medical and Dental Academy. Its objective is: to give undergraduate medical and dental training to young men and women, who shall be between ages of 20 and 25 upon admission and who will be obliged to serve at least five years following graduation in the Armed Forces, U. S. Public Health Service or such other federal branch as might be determined.

It would be expected that the Heller bill, almost identical to one he sponsored unsuccessfully in 1951, would be referred to Armed Services Committee. Instead, it was sent to Interstate Commerce, a parliamentary decision that was to Rep. Heller's liking since he is a member of that group and therefore can be

more effective in expediting action. Incidentally, his 1951 version provided for training of dentists and physicians in its preamble, but through an oversight in drafting the body of the bill made no reference to dentistry. This lapse has been corrected in H.R. 2718.

The Heller bill—and it should be noted that its chances of enactment are decidedly slim because, among other reasons, the military Surgeons General and the Department of Defense are lukewarm toward a West Point system of training medical and dental personnel—represents one type of purported solution to the problem of bolstering Regular Corps strength of Army, Navy, Air Force and USPHS medical and dental services. Congress also is considering a number of other schemes which have a less direct bearing on the manpower question. Foremost among them is the idea of establishing a Department of Health, consolidating all federal health and hospitalization activities—the military excepted—and thereby reducing requirements for full-time professional personnel. President Eisenhower may achieve the same end through exercise of his reorganization powers.

WHITE HOUSE ACTION AWAITED

Up to this time of writing, in the third week of February, Congress was still awaiting word from the White House as to the President's wishes with reference to national health legislation, involving not only the supply of professional manpower but also revision of the social security laws, revamping of the Veterans Administration's Department of Medicine and Surgery and possibly federal financial aid to dental and medical education.

Experienced observers in Washington believe that President Eisenhower and Congress will agree on prompt action for doctor-draft extension and executive reorganization, with a long range study of related factors—such as economics of dental and medical care, increasing the professional reservoir and financing of research—to be undertaken by a special commission which the President will appoint.

National Defense

NEW DRAFT ACT TO RETAIN PRESENT AGE LIMIT OF 51

The new draft law will retain the present age limit of 51 years for the induction of dentists, physicians and veterinarians, it was disclosed February 12 by the Armed Forces Medical Policy Council.

In a Pentagon conference with agencies affected by the proposed legislation to extend the physicians-dentists draft (Public Law 779), Defense Department spokesmen denied previous reports that the age limit for induction of medical and dental personnel might be reduced.

The continuing demand of the Armed Forces for dental and medical personnel, coupled with the inadequate supply of younger professional men who have not completed their military commitments, forces the retention of the present age limit of 51 years, it was reported.

PROPOSALS FOR NEW LAW

Other proposals of the Medical Policy Council for inclusion in the new law which will replace Public Law 779 on its expiration June 30 were embodied in a preliminary draft of the bill, presented to the conference primarily for discussion purposes.

Department of Defense officials stressed that any phase of the bill may be changed before it is submitted to Congress.

Among the Medical Policy Council's suggestions contained in the preliminary bill are the following:

1. The act would terminate June 30, 1955.

2. Dentists, physicians, veterinarians and allied specialists up to the age of 51 would be liable for 24 months of active service.

3. Anyone who served 12 months or more after June 25, 1950 (the beginning of the Korean war) would not be liable to reinduction.

4. Provisions would be made for two classifications: (1) those who have had no military service; (2) those who have served. These classifications would be equivalent to the present law's Priority III and IV, with a "pick-up" provision for men presently in Priority I and II who may not have been inducted as of June 30.

5. Registrants in the non-veteran classification would be inducted according to age, with the youngest being called first; registrants in the veteran classification would be inducted according to length of service, starting with those having the least length of service.

6. In computing credit, active military duty would include periods of training duty.

7. Credit would be given for World War II service prior to ASTP or V-12 training, and also for service with forces allied with the United States in World War II.

8. Aliens could be commissioned with others in their age and service classification.

ADVISORY COMMITTEE CONTINUED

The preliminary bill provides for the continuation of the National Advisory Committee to the Selective Service Sys-

tem for the duration of the act. The Committee would be given explicit authority to appoint state committees to consider deferments and would be empowered to make appropriate recommendations in regard to medical, dental and veterinary school faculties.

It would be mandatory to have a dental member of the National Advisory Committee.

RESERVE REGULATIONS

Any member of a Reserve component unit called to active duty before July 2, 1955 could be appointed or reappointed to a rank commensurate with his experience and training. New reservists, under the proposed law, would be given the assurance that they could get a discharge from their Reserve unit upon their dismissal from active duty.

A Reserve who has already served 24 months could not be recalled in excess of 30 days in any one year without his consent.

EQUALIZATION PAY

The preliminary bill retains the provision of Public Law 779 that anyone who must be drafted is ineligible for the $100-a-month equalization pay provided for dental and medical volunteers.

The interested agencies present at the conference have been invited to make comments on the preliminary bill. The Association's recommendations were passed by the Board of Trustees at its February 27-28 meeting in Chicago. Association representatives will also testify at Congressional hearings on the bill.

Representing the American Dental Association at the Pentagon conference February 12 were Otto W. Brandhorst of St. Louis, president of the Association; Rudolph H. Friedrich of Plainfield, N. J., chairman of the Council on Federal Dental Services; Bernard J. Conway, secretary of the Council; C. Willard Camalier, assistant secretary of the Association, and Francis J. Garvey, secretary of the Council on Legislation.

Association Affairs

COUNCIL TO CONFER ON UNION HEALTH PROGRAMS

Representatives of labor unions have been invited to meet with members of the Council on Dental Health April 13 to discuss mutual aims in the development of dental health programs for union members.

On February 16, preliminary discussions were held when David W. Brock, chairman of the Council, and Allen O. Gruebbel, secretary, accompanied Otto W. Brandhorst, president of the Association, and C. Willard Camalier, assistant secretary of the Association, on a tour of consultations with union officials in Washington, D. C.

The conference with labor union health representatives will take place during the April 12-14 meeting of the Council at the Central Office.

COUNCIL SEEKS APPLICATIONS FOR SCIENTIFIC PROGRAM

Association members may send in applications to participate in the motion picture, scientific exhibit and table clinic programs of the 94th annual session of the American Dental Association to be held September 28-October 1 in Cleveland.

The clinics, exhibits and films should be concerned with some phase of diag-

During the January meeting of the Council on Scientific Session, section chairmen disclosed their plans for the 94th annual session of the Association, to be held September 28-October 1 in Cleveland. Seated (l. to r.): Miles R. Markley, chairman, section on operative dentistry; Charles S. Kurz, Council member; William A. Garrett, Council chairman; Wilbur D. Johnson, Council secretary; Mrs. Marcella C. Riley of the Central Office secretarial staff; Ralph W. Frost, Council member.

Standing: Louis M. Cruttenden, assistant secretary of the Association; Irwin T. Hyatt, chairman, section on oral surgery and anesthesia; Milton E. Nicholson, chairman, section on public health dentistry; Frank M. Kyes, chairman, section on complete prosthodontics; Hamilton B. G. Robinson, chairman, section on research; Bernard O. A. Thomas, chairman, section on periodontics; Harold K. Addelston, chairman, section on pedodontics; Robert M. Ricketts, chairman, section on orthodontics and oral development; Ralph H. Campbell, chairman, section on practice management.

Absent from this picture are Chester M. Perry, chairman, section on partial prosthodontics; H. Cline Fixott, Jr., chairman, section on roentgenology, and Charles H. Patton, Council member.

nosis, treatment, technic or research related to improvement of health and dental practice. The newest films will be given precedence. Applications for participation must be submitted by June 1 to the Council on Scientific Session.

Application forms may be obtained from the Council on Scientific Session, American Dental Association, 222 East Superior Street, Chicago 11.

BOOKS ON CHOOSING LOCATION FOR DENTAL PRACTICE ISSUED

The Bureau of Economic Research and Statistics has compiled two booklets which are designed to help dentists—those about to be graduated and those completing military tours of duty—to decide upon a location in which to practice.

The first booklet, *Distribution of Dentists in the United States, by State, Region, District and County,* contains information on the number of dentists and the general population of each area; it also contains statistics on population growth, per capita buying income and per capita retail sales.

The second booklet, *Facts About States for the Dentist Seeking a Location,* contains information on the ratio of dentists to population, economic conditions in dentistry and in general within the states, dental licensure requirements and lists of officials in the several states from whom additional information can be obtained.

Senior dental students will receive their copies within the next few weeks; other members who wish to obtain the booklets may write to the Order Department of the Association, 222 East Superior Street, Chicago 11.

COUNCIL TO LIST ACCREDITED DENTAL HYGIENE SCHOOLS

All of the 26 schools offering two-year dental hygiene curriculums will have had an opportunity to be inspected and considered for accreditation by June, it was announced at the February 5-6 meeting

of the Council on Dental Education. The Council will then consider the release of a list of accredited dental hygiene programs, states B. L. Hooper of Lincoln, Neb., chairman.

During the recent meeting the Council also approved the dental internship and residency programs of 32 hospitals, to bring to 121 the number of approved hospital education programs.

Reports from various dental specialty boards were reviewed as to their present requirements, use of waiver clauses and their plans for revising or modifying their requirements. No formal action was taken relative to the additional specialty groups which have applied for recognition.

Legislation dealing with dental education problems was studied, and certain resolutions dealing with military recruitment of teachers and students were prepared for referral to the Association's Board of Trustees, it was announced by Dr. Hooper.

LEASED FILMS TO BE SENT TO NEW RETURN ADDRESS

Organizations and individuals who have motion pictures or filmstrips from the American Dental Association's Film Library are advised that the new return address for the films is United World Films, Inc., 605 West Washington Boulevard, Chicago 6. The Library recently engaged this agency to house the films, distribute them and inspect them after use.

ASSOCIATION ISSUES NEW DENTAL HEALTH COMIC BOOK

The third dental health comic book in the "Daredevil Davey" series is now available from the Order Department of the Association. Entitled *Underwater Agent H_2O*, it interprets the story of fluoridation for children under 16 years of age.

Like the other books in the "Daredevil Davey" series, it is priced at $2.85 for 25 copies, $5.15 for 50 copies and $8.85 for 100 copies.

The first booklet in the series, "The Amazing Adventures of Daredevil Davey," is now in its second printing of 50,000 copies, it has been announced by Perry J. Sandell, director of the division of health education, Council on Dental Health. Three additional booklets are scheduled for publication during 1953, he stated.

ASSOCIATION PRESIDENT TO PARTICIPATE IN MEETING

Otto W. Brandhorst, President of the Association, has been invited to participate in the March 18-20 meeting of the National Health Council, at which the recommendations of the President's Commission on the Health Needs of the Nation will be discussed.

Other participants at the meeting will include members of the Commission, representatives of welfare and civic organizations, delegates from state and local health councils and members of the Council's Board of Directors.

COUNCIL OF NATIONAL BOARD SUGGESTS TEST PRINCIPLES

The Council of the National Board of Dental Examiners and its consultants formulated recommendations for its test construction committees across the country during the Council meeting February 11-12 at the Central Office.

Committees of the Council investigated the content of ten subject areas and reviewed past examinations before proposing recommendations which were referred to the whole Council for approval.

All nine Council members participated; they are: Frank Alford, Thomas Birkbeck, William Crawford, C. E. Matteson, Hardy Pool, Victor Steffel, H. H. Weisen-

green, Robert Wells and Gordon L. Teall, chairman. Dr. Crawford was elected vice-chairman at this meeting.

The consultants included: Edgar Coolidge, George Easton, John Knutson, Lee Roy Main, Norman A. Moore, Harold J. Noyes, Capt. G. L. Parke, Therman B. Smith and J. M. Wisan.

The Council and its consultants also reviewed the National Board examinations to be given in April in the light of committee recommendations accepted by the Council to be referred to the test construction committees.

RELIEF FUND CONTRIBUTIONS TOTAL 93 PER CENT OF GOAL

A total of $92,790.39 had been contributed to the Association's Relief Fund drive as of February 15—approximately $7,000 more than had been contributed last year at that date—and 23 constituent societies had oversubscribed their goals.

The societies which had topped their quotas were Alabama, Alaska, Arkansas, Southern California, District of Columbia, Florida, Georgia, Hawaii, Idaho, Indiana, Kentucky, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, North Dakota, Oklahoma, Oregon, Washington, West Virginia and Wyoming.

In contrast, 16 societies had reached their quotas as of February 15 last year.

Among the societies which have achieved more than 90 per cent of their goals are California, Delaware, Illinois, Kansas, Maryland, Michigan, Minnesota, Missouri, North Carolina and Ohio.

Donations may be sent directly to the American Dental Association Relief Fund, 222 East Superior Street, Chicago. They will be credited to the constituent society of the donor. The goal of the drive this year is $100,000.

One of the contributions of more than usual interest was the recent $100 donation to the Relief Fund from the celebrated singer, Hildegarde. When she entertained at the Dallas Mid-Winter Dental Clinic dinner, Hildegarde requested that her fee be sent to several specific charities, one of which was the Relief Fund.

MEMBERS REMINDED TO PAY 1953 DUES BY MARCH 31

March 31 will be the "cut-off" date for dentists who have not renewed their Association membership for 1953. In accordance with the decision of the House of Delegates at the 1952 annual session, subscriptions to THE JOURNAL and other membership benefits will be discontinued for 1952 members who have not paid their 1953 dues by the end of this month. Harold Hillenbrand, secretary of the Association, has urged constituent society secretaries to transmit all dues promptly so that insurance coverage, subscriptions and other services to individual members will not be jeopardized.

RED CROSS APPEAL ISSUED BY ASSOCIATION PRESIDENT

Otto W. Brandhorst of St. Louis, president of the American Dental Association, issued this statement on the occasion of the opening of the annual March fund drive of the Red Cross:

The American Red Cross will shortly call upon the citizens of the United States to support its 1953 campaign. It is impossible to estimate the total good that accrues from the funds thus raised.

Day in and day out, year after year, the hands of the Red Cross reach out to give relief to persons in service and out of service, wherever and whenever the need.

The American Dental Association feels that it is a privilege to support this drive for funds and is sure that the members of the profession will respond to the call.

Dental Societies

COMPONENT SOCIETIES CITE WOMEN DENTISTS' SERVICE

The considerable service rendered to the dental profession in the United States by women dentists was spotlighted recently when Elsie Cole of Scranton, Pa., assumed office as president of the Scranton District Dental Society.

Elsie Cole

Dr. Cole has practiced dentistry in Scranton with her dentist husband, Jesse Cole, since 1914. She was graduated in 1913 from the Philadelphia Dental College, now the dental school of Temple University.

Eleanor Carlson

In Oregon, Eleanor Carlson of Roseburg is now president of the Umpqua District Dental Society, having succeeded from the vice-presidency when the former president was called into service. Dr. Carlson was graduated in 1930 from the graduate of Texas Dental College, Dr. McCann will soon complete her thirtieth year of practice in San Antonio.

University of Southern California School of Dentistry. She has three children.

Former component society presidents include two well-known women dentists of Illinois, Mary B. Meade of Carmi and E. Ethel Taggart of Freeport.

Marguerite McCann

Currently, two other women dentists hold the highest office in their component societies. Marguerite B. McCann of San Antonio, Texas, is president of the San Antonio District Dental Society. A

Mary Meade

Dr. Meade served as president of the Wabash River Dental Society in 1921, seven years before she was elected president of the American Association of Women Dentists. She was graduated from

St. Louis Dental College in 1907. Dr. Taggart, who was graduated from Northwestern University Dental School in 1921, served as president of the Northwest District Dental Society of Illinois six years later.

Dr. Meade has suggested that other societies might wish to inform THE JOURNAL of their former women officers and thus give recognition to others who have written the outstanding record of women in dentistry.

PHILADELPHIA DENTAL SOCIETY PRAISES TV HEALTH SERIES

The Philadelphia County Dental Society recently awarded television station WPTZ of Philadelphia a special citation on the occasion of the 250th telecast in its "You and Your Health" series. John P. Looby, president of the Society, presented the distinguished service citation, which lauds WPTZ for "pioneering and developing . . . health education in the field of television." The station also received citations from the county medical society and department of public health.

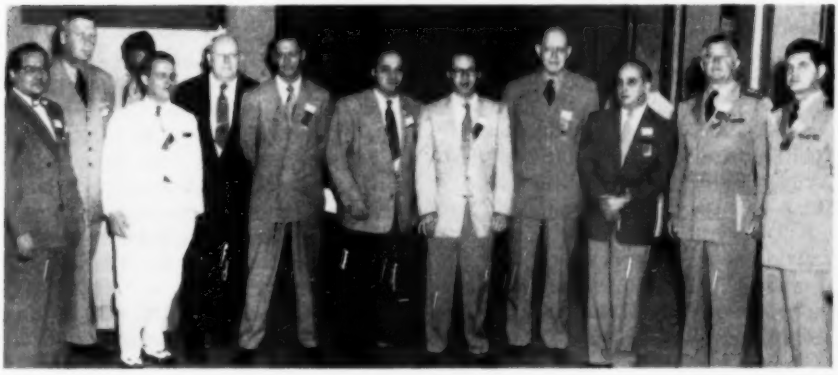
DISTRICT OF COLUMBIA LISTS REGISTERED CLINICIANS

Eight registered clinics will be presented at the District of Columbia Dental Society's 21st annual postgraduate clinic, to be held March 15-18 at the Shoreham Hotel, Washington, D. C. Each clinic will be of two hours' duration and will be presented twice during the four-day period.

The clinicians and their subjects are:

Samuel Charles Miller of New York, traumatic occlusion, its detection and correction;

Faustin W. Weber of Memphis, Tenn., orthodontic obligations in dental practice;



Shown at the recent annual meeting of the Colegio de Cirujanos Dentistas de Puerto Rico are (l. to r., above): Jose M. Gonzalez, Puerto Rican representative in the Association's House of Delegates; Col. Carlos Schuessler of the U. S. Air Force Dental Corps; Ernesto Davila, president of the Board of Dental Examiners of Puerto Rico; LeRoy M. Ennis, past president of the American Dental Association; Harold Hillenbrand, Association secretary; Ernest T. Lewis of the University of Pittsburgh; I. Norton Brotman of the University of Maryland; Col. John S. Oertel of the U. S. Army Dental Corps; Julio Nagaglioni, retiring president of the Colegio; Adm. Daniel W. Ryan of the U. S. Navy Dental Corps, and Cmdr. Myron C. Turner of the U. S. Navy Dental Corps.

A Children's Dental Health Week was observed February 1-7 in Philadelphia to coincide with the Greater Philadelphia Dental Meeting. Car cards in buses (left), store window displays, radio and television programs and school contests marked the week. Shown at the award program ending the public and parochial school dental health and poster contests are (l. to r.) Abraham Cohen, dental supervisor of the Philadelphia Public School System; Stephen Pinsk, representing Bryant School, which had the best dental health record in District 1 of the public schools; Louise Nardella of Hallahan Catholic High School, winner of the dental health poster contest of the parochial schools, and John P. Looby, president of the Philadelphia County Dental Society.

John T. McSweeney of New York, advanced phases of oral dynamics;

Gustave Kruger of Washington, D. C., alveolectomy and preparation of mouth for dentures;

S. Charles Brecker of New York, a practical concept of oral rehabilitation;

Max Pleasure of New York, a basic principle of full denture construction;

Mack L. Parker of Bethesda, Md., partial denture planning for normal and abnormal jaw relations;

Frank H. Nealon of Cleveland, nonpressure procedure for acrylic restorations.

WISCONSIN DENTAL SOCIETY TO MEET APRIL 6-9

Seven registered study courses will be offered during the 83rd annual meeting of the Wisconsin State Dental Society, to be held April 6-9 in Milwaukee.

Clinicians and their course subjects include: Frank F. Lamons of Atlanta, Ga., five critical caries periods from a clinical viewpoint; Lester W. Boyd of Chicago, a version of the Meyer technic for balanced dentures; C. H. M. Williams of Toronto, occlusal correction by grinding; Edwin S. Smyd of Detroit, cavity preparation; A. A. Moss of Bernardsville, N. J., waking hypnotic suggestion, and Arthur W. Spivey of Indianapolis, surgery in general practice. All of the foregoing will be presented twice.

The final study course will be presented by the Milwaukee Orthodontic Study Club, which will demonstrate the construction and manipulation of the Johnson twin-wire appliances.

Further information may be obtained from Kenneth Crane at the central headquarters of the Wisconsin State Dental Society, 704 West Wisconsin Avenue, Milwaukee 3.

Legislation

MEDICAL AND DENTAL ACADEMY FOR ARMED FORCES PROPOSED

The establishment of a "United States Medical and Dental Academy" is proposed in bill H. R. 2718 introduced February 6 by Rep. L. B. Heller (D., N. Y.). The Academy would be "a medical and dental training school for the instruction of physicians and dentists for the armed services and the Public Health Service of the United States . . . " Students would be appointed from each state and territory in the same manner in which students are appointed to the U. S. Military Academy or the U. S. Naval Academy. They would be students who have completed their pre-dental or pre-medical education and have qualified for entrance into the regular medical and dental curriculums.

NEW BILLS ON FLUORIDATION, TAX-EXEMPT MEDICAL EXPENSES

A bill "to protect the public health from the dangers of fluorination of water" was submitted to the House of Representatives January 29 by Rep. Roy W. Wier (D., Minn.) at the request of a group of his constituents. The bill (H.R. 2341) would prohibit any federal, state or municipal agency from fluoridating its public water supply. It was referred to the Committee on Interstate and Foreign Commerce.

A bill (H.R. 2243) introduced January 29 by Rep. P. B. Dague (R., Pa.) would remove limitations on the amount of medical and dental expenses which may be deducted from taxable income. All medical care expenses not compensated for by insurance or otherwise would be deductible, including amounts paid for accident or health insurance during the taxable year. This bill was referred to the House Committee on Ways and Means.

BILL PROPOSES ARMY SCHOOL AWARD GRADUATE DEGREES

A bill which would authorize the Army Medical Service Graduate School to award Master of Science and Doctor of Science degrees in medicine, dentistry, veterinary medicine and basic health sciences has been introduced in the House of Representatives by Rep. Dewey Short (R., Mo.).

The bill provides:

> That the Commandant of the Army Medical Service Graduate School may, under such rules and regulations as the Secretary of the Army may prescribe, confer the degrees of master of science and doctor of science upon persons successfully completing acceptable graduate work in medicine, dentistry, veterinary medicine, and in the biological sciences involved in health services, in accordance with the standards of the Association of American Medical Colleges and appropriate other accrediting agencies, upon accreditation by the appropriate professional authority of the applicable curriculum leading to such degrees.

The Council on Dental Education has recorded its opinion that although it favors the continuance of postgraduate courses at the Army School, it believes the granting of Master of Science and Doctor of Science degrees should continue to be confined to recognized universities or other academic institutions.

BILL TO LICENSE TECHNICIANS TABLED IN WASHINGTON STATE

On February 3 a bill for licensure of laboratory technicians was tabled by the Washington state legislature after a hearing before the House Committee on Medicine, Dentistry and Drugs.

The bill proposed in part that "no person, other than a licensed dental technician, shall make, produce, reproduce, construct, furnish, supply, alter or repair any prosthetic denture, bridge, appliance or thing to be used in, upon or in connec-

tion with any human tooth, jaw or associated structure or tissue, or in the treatment of any condition thereof, except a duly licensed dentist or a duly licensed physician."

The establishment of a state dental technician board to examine and license technicians was also proposed.

International

PHILIP E. ADAMS APPOINTED U. S. TREASURER FOR F. D. I.

Philip E. Adams of Boston has been appointed Fédération Dentaire Internationale treasurer in the United States, succeeding Oren A. Oliver of Nashville, Tenn., who is now president of the F.D.I.

LeRoy M. Ennis of Philadelphia has been selected to represent the American Dental Association at the annual meeting of the Fédération July 23-August 1 in Oslo, Norway.

ANNOUNCE SUBSCRIPTION RATE OF INTERNATIONAL JOURNAL

The *International Dental Journal*, quarterly publication of the Fédération Dentaire Internationale, is being offered to dentists in the United States for a yearly subscription fee of $8.50. Edited by Professor H. H. Stones of the University of Liverpool, the publication contains reports from all over the world on dental research projects, trends, new developments and activities.

Subscription orders are now being accepted by British Publications, Inc., 30 East 60th Street, New York 22.

AMERICAN DENTISTS INVITED TO AUSTRALIAN CONGRESS

Association members interested in attending the thirteenth Australian Dental Congress, to be held June 1-5 in Brisbane, have been asked to write directly to Colin Cormie, publicity officer, Australian Dental Congress, Box 1145, P.G.P.O., Brisbane, Australia.

W.H.O. ASKED TO APPOINT DENTAL OFFICER TO STAFF

The appointment of a permanent dental officer to the World Health Organization staff has been requested by the Fédération Dentaire Internationale.

The F.D.I. memorandum to the W.H.O. executive board pointed out that although the W.H.O. Assembly has repeatedly proposed the institution of an international dental health program, no such program can be administered until a permanent dental officer is assigned.

The memorandum also noted that F.D.I. assistance in dental matters has been asked but has been hampered by the lack of a permanent dental officer with whom the Fédération can deal. If acted upon favorably by the W.H.O. executive board, the F.D.I. request will be considered by the Assembly in May.

NEW PHILIPPINE LAW DEFINES DENTAL PRACTICE, EDUCATION

The government of the Philippine Islands has passed a new dental act (Law 417) which provides that a dentist may perform any operation in the human mouth, jaws and surrounding tissues and may also treat oral lesions.

Law 417 also prescribes educational requirements for dentists in the Philippines as: a minimum of two years of predental study, which should include cultural and biological courses; four years of professional education in a qualified dental school.

The Philippine Dental Association, which supported the new law, states that the educational standards are modeled on those of the United States dental schools.

The above group assembled at the recent tea given by the Seoul (Korea) Dental Association to honor Col. William T. Williams, Army Forces Far East Dental Surgeon, and Col. Pearson W. Brown, Eighth Army Dental Surgeon. Seated (l. to r.) are: Capt. R. A. Dietzschold, Capt. L. W. Larson, Ahn Pyong Sik, Colonel Brown, Colonel Williams, Capt. A. H. Severino, Capt. D. E. Drucker, Capt. M. B. Flippen, Capt. V. P. Della Rocca, Lieut. B. H. Olbrys. Dr. Ahn is chairman of the Seoul Dental Association.

Standing are other members of the Seoul Dental Association: Kim Chong Won, Lee Pyong Tai, Chang Myong Zin, Jon You Jin, Park You, Lee Hi Chang, Lee Hyung Goo, Moon Tong Sun, Cho Yong Ki, Yun Kwang Soo, Bai Zin Kook, You Ki Hong, Nan Sang Kyom, Park Poo Yong, Kim Yon Kon.

KOREAN DENTISTS' PROBLEMS TOLD BY U.S. DENTAL OFFICER

Nine dental officers of the United States Army in Korea recently were guests of members of the Seoul (Korea) Dental Association at a tea in honor of Col. William T. Williams, Army Forces Far East Dental Surgeon, and Col. Pearson W. Brown, Eighth Army Dental Surgeon.

"After the tea," reports Colonel Brown, "Dr. P. S. Ahn, chairman of the Seoul Dental Association, addressed the group, expressing his organization's thanks to the Americans for the help the Dental Corps has given the Korean people by way of humanitarian treatment.

"He explained that due to the destruction of the war their own equipment and buildings are woefully inadequate. A large percentage of the Korean people themselves are so impoverished that they cannot afford dental service. Therefore, the members of this Association are doing almost exclusively eleemosynary work."

Exchange visits were requested to allow Korean dentists to visit U. S. Army dental clinics and Army officers to visit Korean dental offices.

Colonel Brown also states that Korean dentists have asked dental officers for journals and textbooks in English to help them bring their clinical procedure up to date. Many others need equipment and "would welcome any salvageable pieces."

Colonel Brown will distribute to Korean dentists any books, journals or equipment which any member of the American Dental Association may care to donate. His address is Dental Surgeon, Hq Eighth U. S. Army Korea (EUSAK), APO 301, c/o Postmaster, San Francisco, Calif.

Dental Education

EASTMAN DENTAL DISPENSARY ANNOUNCES NEW PROGRAMS

The newly-formed joint department of dentistry and dental research of the Eastman Dental Dispensary and the University of Rochester will offer graduate dentists opportunities for postgraduate training in six educational programs, it was recently announced.

The facilities of both the University and the Dispensary will be available to those qualified candidates who undertake any of the programs listed below:

Master of Science Degree • The two year program leading to a master's degree in dental science will include basic science courses and dental research seminars at the University's School of Medicine and Dentistry, clinical activities at the Eastman Dental Dispensary and research work at both institutions.

Tuition is required for courses taken at the University of Rochester. Clinical fellowships paying $2,500-$2,900 annually are available. Application should be made to the Eastman Dental Dispensary, Rochester 3, N. Y.

University Graduate Study Certificate • The certificate will be awarded to those who satisfactorily complete ten months of service at the Dispensary, together with attendance at seminars, adequate accomplishment in dental science and dental specialty courses and presentation of a research paper or interesting case reports.

Fellowships paying $2,000 are available. Application should be made to the Eastman Dental Dispensary.

Basic Science and Research Training • Fellowships paying $2,000 annually are offered for dental graduates wishing to prepare for teaching or research careers. Appointment is for one or more years; candidates may work for M.S. or Ph.D. degrees. Application should be made to the University of Rochester School of Medicine and Dentistry.

Eastman Dental Dispensary Internships • Training in all aspects of children's dentistry is offered in the clinics of the Dispensary with optional assignment in surgery at Strong Memorial Hospital. Appointees may participate in courses and research activities with graduate students. Uniforms and instruments are supplied; a weekly stipend of $45-$55 is provided.

Strong Memorial Hospital Internships and Assistant Residencies • Training is offered in oral surgery and all phases of adult dentistry together with opportunity for experience in anesthesia and research. Uniforms, instruments and residence are supplied in addition to an annual stipend of $500-$900. Application should be made to Surgery Department, Strong Memorial Hospital, Rochester.

Specialty Training Programs • Special appointments can be arranged at the Eastman Dental Dispensary and Strong Memorial Hospital for those wishing to prepare themselves for specialization in pedodontics, orthodontics, oral surgery and periodontology.

OAK RIDGE INSTITUTE OFFERS RESEARCH TECHNIC COURSES

An advanced course in autoradiography and three basic courses in radioisotope technics will be presented during the summer by the Oak Ridge (Tenn.) Institute of Nuclear Studies.

The autoradiography course will be held June 15-25, and the radioisotope courses of four weeks' duration will begin June 8, July 6 and August 10. All are intended for research level personnel using or planning to use these technics in their research.

Application forms and additional information may be obtained from the Special Training Division, Oak Ridge Institute of Nuclear Studies, P. O. Box 117, Oak Ridge, Tenn.

TWO INTERNSHIPS AVAILABLE IN SAN FRANCISCO HOSPITALS

The San Francisco County Hospital and the University of California Hospital in San Francisco are each offering an internship in oral surgery. Application forms

may be obtained by writing to Willard C. Fleming, dean of the College of Dentistry, University of California Medical Center, San Francisco 22.

PROSTHODONTICS RESIDENCY AVAILABLE AT VA HOSPITAL

A two-year residency in prosthodontics which will begin July 1 is being offered at the Veterans Administration Hospital at Wood, Wis. Its successful completion qualifies the resident to apply to the American Board of Prosthodontics for examination. Applications and outlines of the program may be obtained from the dental director of the Veterans Administration Hospital, Wood, Wis.

A three-year residency in oral surgery also will be offered by the Hospital in 1954. Information about this program also may be obtained by writing to the dental director of the Hospital.

GRADUATE COURSE IN ORTHODONTICS ANNOUNCED

The University of Pittsburgh School of Dentistry is now accepting applications for a two-year graduate course in orthodontics, leading to a Master of Science degree. Further information may be obtained from the Director of Graduate Study, School of Dentistry, University of Pittsburgh, Pittsburgh 13.

FILMS LOANED, NOT SOLD, BY UNIVERSITY OF MINNESOTA

Two films reviewed in the November issue of THE JOURNAL, *Correction of Deformity of Jaws* and *Bone Graft and Plating of Mandible,* were incorrectly described as available for purchase from the University of Minnesota School of Dentistry. The films are available for loan only, it has been stated by school authorities.

WENDELL L. WYLIE APPOINTED ASSISTANT DENTAL DEAN

The appointment of Wendell L. Wylie as assistant dean of the University of California College of Dentistry recently was announced by Willard C. Fleming, dean.

W. L. Wylie

Dr. Wylie has been professor of orthodontics and division chairman at the University since 1945, with the exception of the 1949-50 terms, when he served as director of postgraduate dental education at the University of Washington Dental School, Seattle.

Representing the American Association of Dental Schools, Dr. Wylie participated in the early development of the aptitude testing program of the American Dental Association's Council on Dental Education. He is a contributor to dental literature, a member of the American Association of Orthodontists and editor of *The Angle Orthodontist.*

DENTAL SCHOOLS ANNOUNCE POSTGRADUATE COURSES

Tufts • A postgraduate course in oral pediatrics will be presented June 15-19 at Tufts College Dental School by Kenneth A. Easlick of Ann Arbor, Mich., and the staff of the department of oral pediatrics of Tufts Dental School.

The five consecutive full-day sessions will include didactic instruction, lectures and

clinical work by the participants. Dr. Easlick will supervise and will be assisted by Tufts staff members. Enrollment will be limited to 12.

Application may be made by writing to the director of graduate and postgraduate studies, Tufts College Dental School, 136 Harrison Avenue, Boston.

Columbia • A course on the principles of occlusion, consisting of lectures, seminar conference, group participation and clinical demonstrations will be given April 8-10 at Columbia University School of Dental and Oral Surgery by Lewis Fox and associates.

The course will present the fundamentals of occlusion of the teeth in relation to the physiology and pathology of the periodontal supporting tissues. Applications will not be accepted after March 20. Information concerning the required instruments and materials will be forwarded to those whose applications are accepted.

Details may be obtained by writing to Barnet M. Levy, director of the postgraduate division, School of Dental and Oral Surgery, Columbia University, New York 32.

Temple • A course on the fundamentals of occlusion in relation to the physiology and pathology of periodontal supporting tissues will be presented June 8-10 by Temple University School of Dentistry.

Applications may be addressed to the director of postgraduate studies, Temple University School of Dentistry, 3223 North Broad Street, Philadelphia 40.

Oregon • Postgraduate courses to be presented at the University of Oregon Dental School during the spring term include the following:

Functional analysis of occlusion, taught by Henry L. Beyron of Stockholm, Sweden, will be presented April 13-14.

Oral pathology and diagnosis, a lecture course and seminar will be presented April 2-3 by Col. Joseph L. Bernier of Washington, D. C.

Hydrocolloid procedures for restorative dentistry will be presented April 20-24 by F. Raymond Garvey of St. Paul, Minn.

Oral surgery will be presented May 4-8 by Samuel A. Brandon of the University of Oregon Dental School staff.

Dental roentgenology, parallel technic, will be presented May 11-15 by H. Cline Fixott, Jr., of the Dental School staff.

Interpretation of roentgenograms will also be presented by Dr. Fixott, May 18-22.

Information and applications may be obtained from Ernest A. Hurley, head of the department of postgraduate education, University of Oregon Dental School, 809 Northeast Sixth Avenue, Portland 14, Ore.

Ohio State • The College of Dentistry, Ohio State University, will offer three orthodontic curriculums in the fall: full-time graduate study for two academic years, full-time postgraduate work for 18 months and part-time postgraduate work for 24 months.

Graduate work may lead to a degree of Master of Dental Science; certificates are granted upon completion of the postgraduate courses. The part-time postgraduate course is designed for dentists who have practices near Columbus and prefer to continue those practices on a limited basis while studying for specialization. Classes are conducted the first three days of each week for eight quarters.

Correspondence relating to advanced training in orthodontics may be addressed to the College of Dentistry, Ohio State University, Columbus 10, Ohio.

New York • Special summer postgraduate courses will be offered by the department of denture prosthesis of New York University dental school, June 1-12.

Complete dentures, a 60-hour course of lectures, demonstrations and clinical practice, will be presented in sessions of two parts. The first part of each session includes a lecture and a patient demonstration, during which a maxillo-mandibular restoration is completed. The second part of each session is spent in the clinic, where each registrant makes a complete denture restoration for an edentulous patient.

Partial dentures, a 60-hour course, will include demonstrations of the construction of one-piece cast partial dentures. Clinical practice encompasses all phases of partial denture design and construction, from impression making to insertion and correction of occlusion.

Further information may be obtained from the postgraduate division, New York University College of Dentistry, 209 East Twenty-third Street, New York 10.

Public Health

ILLINOIS DENTAL DIRECTOR APPOINTED TO GEORGIA POST

John E. Chrietzberg, deputy director in charge of the division of dental health of the Illinois Department of Public Health since 1947, recently resigned his position to accept a similar post with the Georgia Department of Public Health. He succeeds J. G. Williams who served in the Georgia post for the last 21 years without remuneration. Dr. Williams continues as a member of the Georgia State Board of Health.

In Illinois John E. Zur has been named acting deputy director to succeed Dr. Chrietzberg. Dr. Zur has been with the department since 1947.

CONFERENCE ON WORLD HEALTH TO CONVENE IN WASHINGTON

A National Conference on World Health, sponsored by the National Citizens' Committee on W.H.O., will be held April 6-8 in Washington, D. C., it has been announced by Frank G. Boudreau, M.D., Committee chairman.

Individual citizens and representatives of organizations participating in the conference will discuss issues involved in world health work, particularly those problems encountered by the World Health Organization. The conference will convene April 6, the day after Easter, at the Shoreham Hotel.

Reservations and further information may be obtained from Conference Headquarters, National Citizens' Committee for W.H.O., 1790 Broadway, Room 806, New York 19.

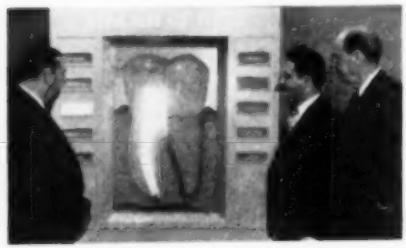
62,000 DENTISTS PARTICIPATE IN VA DENTAL CARE PROGRAM

During the fiscal year ending last June 30 a total of 62,000 dentists participated in home-town dental care programs of the Veterans Administration on a fee basis, states the newly-released VA report for the fiscal year of 1952.

The Veterans Administration expended approximately $34,000,000 for outpatient dental care during fiscal 1952, as compared to about $40,000,000 for the previous year, the report showed.

A division of dental hygiene was recently established by the Arkansas State Board of Health. Shown at the official ceremonies are (l. to r.): Maurice J. Friedman, chairman of the dental health committee, Arkansas State Dental Association; Governor Francis Cherry of the State of Arkansas; J. T. Herron, state health officer, to whose department the division will be added, and Don Hamm, secretary of the Arkansas State Dental Association and vice-president of the Arkansas State Board of Health.

Dr. Herron has since announced that H. Shirley Dwyer of New Hampshire has accepted the position of director of the division and will assume office March 15. The new agency will be organized according to the American Dental Association's recommendations for dental hygiene divisions.



One of the Cleveland Health Museum's best known dental exhibits, entitled "Structure of Tooth," has been duplicated for the fourth time in the Museum's workshops and has been donated to the University of Nebraska by Ralph M. Mueller, Museum trustee and Nebraska alumnus. Shown with the exhibit, which simultaneously identifies and illuminates the 10 structural parts of a tooth, are (l. to r.): L. C. Meier, president of the Cleveland Dental Society; Joseph D. Lucas, curator of exhibits at the Museum, and Mr. Mueller.

Tours of the Cleveland Health Museum will be a feature of the Association's 94th annual session, to be held September 28-October 1 in Cleveland.

DENTAL PUBLIC HEALTH BOARD SCHEDULES EXAMINATION

The American Board of Dental Public Health will hold its next certifying examination September 24-25 in Cleveland, preceding the 94th annual session of the American Dental Association.

Applications for admission to the Board examination should be submitted not later than June 25 to the secretary of the Board, Philip E. Blackerby, Jr., 250 Champion Street, Battle Creek, Mich.

NEW YORK CHILDREN'S TEETH EXCELLENT, REPORTS BUREAU

The dental health of New York City school children is excellent, it has been reported by the City's Department of Health in its annual report for 1952. The dental education program of the Bureau of Dentistry enrolled 800,000 children, two thirds of whom received dental care during the report year (34,500 were treated in the Department of Health's 146 dental clinics; the remainder were cared for by private dentists or other clinics).

During 1952 the Department dentists placed more than 350,000 fillings; extracted more than 18,000 teeth and took more than 30,000 roentgenograms.

General

NEW YORK DENTAL LEADER, WALDO H. MORK, DIES

Waldo H. Mork, president of the Dental Society of the State of New York during 1945-46, died February 11 at the age of 70. A graduate of the New York College of Dentistry, Dr. Mork had practiced in New York City for nearly 50 years and had been one of the first practitioners to use roentgenograms in oral diagnosis. He had been supervisor of the Dental Health Service of New York City and chairman of the Oral Hygiene Committee of Greater New York.

Dr. Mork served repeatedly as a delegate to the annual sessions of the American Dental Association, of which he was a life member. During the recent 93rd annual session, he was chairman of the reference committee on public health, and for many years he had been chairman of the Association's Prosthetic Dental Service Committee, forerunner of the present Council on Dental Trade and Laboratory Relations.

He was a founder of the Bronx County Dental Society and had been president of the First District Dental Society, chairman of the publications committee of the *New York State Dental Journal* and a member of the New York Academy of Dentistry and the American College of Dentists.

His contributions to the dental literature dealt with preventive dentistry, administration of dental organizations and children's dentistry. He had been a staff member of the Bellevue, Fordham and Sydenham Hospitals.

TEMPLE UNIVERSITY ALUMNI HONOR DENTAL SCHOOL DEAN

Gerald D. Timmons, dean of the Temple University School of Dentistry, recently received the Russell H. Conwell Award, the highest honor granted by the General Alumni Association of Temple University.

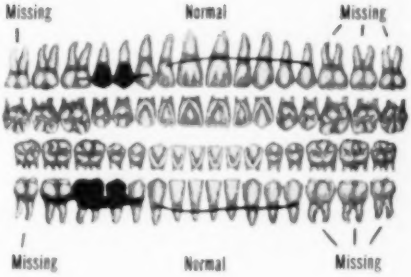
The award, named for the founder of Temple University, was presented to Dr. Timmons in founder's day ceremonies February 14, "in recognition of his great service to the dental profession and to the dental school of Temple University."

Identified with dental education for more than 30 years, Dr. Timmons, who is also a professional pharmacist, taught at Indiana University School of Dentistry from 1925 to 1938, when he was named acting dean of the school. In 1940 he became executive secretary of the American Dental Association, and in 1942 he began his association with Temple University.

POLICE USE DENTAL CHART TO TRACE IDENTITY OF WOMAN

Dentists have been asked to aid police in determining the identity of a woman who died recently at a San Jose, Calif., hotel. The well-dressed woman was about 55 years old, 5 feet 3 inches tall, 130 pounds and had blue eyes, grey hair and glasses. Although she registered under the name of "Anna Meade of Albuquerque, N. Mex.," she gave a false address and is unknown to Albuquerque authorities.

The San Jose dentist who made the above tooth chart for police has furnished this description of the woman's teeth:



Upper teeth—right third molar missing; right second molar intact; fixed bridge (gold and porcelain) replacing right first and second bicuspids, attached to right cuspid and right first molar; right lateral incisor to left second bicuspid, inclusive, normal and fine appearing, in even alignment and without apparent dentistry; left first, second and third molars missing.

Lower teeth—right third molar missing; one piece, removable unilateral type restoration, all gold casting, with teeth attached, replacing second bicuspid and right first molar—clasps on right first bicuspid and right second molar; right cuspid to left second bicuspid, inclusive, in place and fine appearing, in even alignment and without apparent dentistry; left first, second and third molars missing.

Information on the unidentified woman may be sent to Thomas Kilmartin, Coroner, Hall of Records, San Jose 13, Calif.

CLEFT PALATE TREATMENT TO BE TOPIC OF MEETING

Meetings of a section on dental, prosthetic and orthodontic problems in cleft palate treatment will be held during the annual meeting of the American Association for Cleft Palate Rehabilitation April 27-28 in Atlanta, Ga.

A program of motion pictures and special exhibits relating to cleft palate

rehabilitation also will be presented. The meeting is open to all interested persons.

Further information on the program may be obtained from Willard T. Hunnicutt, 302 Medical Arts Building, Atlanta, Ga. Information on membership in the organization may be obtained from Jack Matthews, 1617 Cathedral of Learning, University of Pittsburgh, Pittsburgh 13. Dr. Matthews is the organization's secretary.

ACADEMY FORMED TO PROMOTE DENTAL CARE OF HANDICAPPED

The Academy for Oral Rehabilitation of Handicapped Persons, a newly-formed organization, will hold its first meeting in conjunction with the 94th annual meeting of the American Dental Association in Cleveland during the latter part of September.

The purposes of the Academy are listed as follows:

To promote and maintain high standards of dental care and treatment of the physically and mentally handicapped persons.

To encourage and assist dental practitioners to prepare and qualify themselves to treat physically and mentally handicapped persons.

To promote research in all branches of dental care and treatment of the physically and mentally handicapped persons and to publish the results thereof.

Information about the Academy may be obtained by writing to Manuel M. Album, 1930 Chestnut Street, Philadelphia 3.

COLORADO DENTAL FOUNDATION ANNOUNCES ANNUAL SEMINAR

The histopathology of the oral cavity will be the topic of the seventh annual seminar of the Colorado Dental Foundation, to be held June 21-25 at the Fine Arts Center, Colorado Springs, Colo.

Harry Sicher of Chicago, Joseph L. Bernier of Washington, D. C., Balint Orban of Colorado Springs and Joseph P. Weinmann of Chicago will participate in lecture and microscopy sessions.

Further information may be obtained and registration may be made by writing to the Colorado Dental Foundation, 629 North Nevada Avenue, Colorado Springs, Colo.

GRACE ROGERS SPALDING, PIONEER PERIODONTIST, DIES

Grace Rogers Spalding, pioneer specialist in periodontics, died January 7 in Birmingham, Mich. She was 71 years old and had been a practicing periodontist since 1904, when she was graduated from the University of Michigan Dental College.

Dr. Spalding was a founder and past president of the Academy of Periodontology. In 1930 she established the Academy's *Journal of Periodontology* and edited it for 20 years. Dr. Spalding was one of the first women to be elected to membership in the American College of Dentists. In 1926 she was secretary of the periodontology section of the International Dental Congress which was held in Philadelphia.

Survivors include her dentist husband, Edward Spalding, and a daughter.

GERMAN DENTAL SCIENTIST, OSKAR WESKI, DEAD

Oskar Weski, German investigator and writer in the field of periodontics and honorary president of ARPA Internationale, died recently in Berlin, Germany, at the age of 73.

Dr. Weski, author of the well known *Atlas of Roentgenologic Anatomy of the Cranium, the Jaws and the Teeth*, introduced the concept of the "dental organ," consisting of the tooth and its supporting structures, which he called "paradentium"; the American equivalent is "periodontium."

Founder of the German ARPA (Association for Research in Periodontal Dis-

eases), Dr. Weski was a charter member of the ARPA Internationale and became its honorary president in 1932.

INTERNATIONAL ACADEMY OF ANESTHESIOLOGY TO MEET

Members of the International Academy of Anesthesiology will attend a one-day seminar in general anesthesia, to be presented May 13 at the George Washington University Hospital, Washington, D. C.

Charles S. Coakley, the eminent director of anesthesiology at the hospital, will demonstrate anesthetic procedures relating to oral operations.

The meeting and seminar will be open to interested dentists, as well as to members of the International Academy. Further information may be obtained from Irwin G. Tomack, executive secretary, 355 East 149th Street, New York 55.

BETTER BUSINESS BUREAU WARNS DENTISTS OF SWINDLER

Two Shreveport, La., dentists recently cooperated in the conviction of E. M. Williams, 60, on charges of swindling. The dentists testified that the defendant took orders for dental jackets and towels, collected payments amounting to $68 and $72 and neglected to fill the orders during the two years between his visit and his trial.

Mr. Williams' record of taking orders for nurses' and dentists' uniforms, collecting funds and failing to deliver has been reported to Better Business Bureaus at various times since 1947. He will be released in June. The Better Business Bureau of Shreveport has asked THE JOURNAL to warn dentists of the possibility that Mr. Williams may then revert to his former practices in calling on dental offices.

Also . . . The total number of communities receiving fluoridated water in the United States reached 600 as of February 9, it was announced by the Council on Dental Health. . . . The Northwest Conference of Dental Medicine will meet April 19-22 in Victoria, British Columbia. Registration may be made with Gladys Underwood, Selling Building, Portland, Ore. . . . An electron microscope which can enlarge 20,000 times is in use at Northwestern University Dental School. James J. Kennedy, assistant professor of pedodontics, has been awarded a USPHS grant of $5,000 for studies with the microscope, it has been announced by Charles W. Freeman, dean. . . . Leslie M. FitzGerald, president-elect of the Association, will be the featured essayist at the Temple Dental School alumni day, May 13. A testimonial dinner for James R. Cameron will climax the day's activities. Dinner tickets may be obtained from Herman Naylor, Temple Dental School, Philadelphia. . . . The officers of the Wisconsin State Dental Society report that they are all members of the 1918 class of Marquette University Dental School. They are Earl Calkins of Racine, president; Harry Hahn of Milwaukee, president-elect; Robert Mason of Milwaukee, secretary, and C. P. Collins of Kenosha, treasurer. . . . Max E. Soifer, 51, well-known editor of the Connecticut State Dental Association and past national president of Alpha Omega fraternity, died January 7 in Hartford. . . . The Council on Journalism will hold its second annual Dental Journalism Conference June 5-6 in the Central Office of the Association.

The Reader Comments

MULTIPLE STATE BOARDS VERSUS RECIPROCITY

Something should be done about state board examinations.

It is my belief that all dental schools in the United States are essentially similar in curriculum and teaching capabilities. Dentists all are taught the same methods and are graduated with the same background; we are capable of practicing dentistry anywhere in the country, I might add, the entire world. Why, then, is it necessary for a graduate dentist to take state board examinations all over again when he wishes to practice in another state?

Isn't it ridiculous to assume that a man in practice for a number of years should take new board examinations in order to work in a new state? Why can't we break down these barriers and allow a man to go anywhere in the country to practice wherever he wishes?

I believe this is the reason most of the dentists in the country are concentrated in a small area. Many small towns out West are without men who might otherwise be practicing there but for the fact that they must begin all over again and take state boards. I have been in practice for 17 years, but I don't believe I could pass a board examination today without intense study. Does that mean I am incompetent as a dentist? Besides, what earthly good are state boards which do not add to your ability to practice good dentistry?

This situation has seemed absurd to me for years, and the more I think about it, the more ridiculous it seems. Just think of the number of men who would travel to less populated areas and who could be doing the people in these areas so much good. Recently I had a patient from Arizona who had to travel 50 miles to Phoenix to her dentist. This seems unnecessary in this day and age.

Some friends recently took the Florida board after establishing residency there for a year. Needless to say they failed, although they had practiced for a number of years. Don't you think that is going too far? Are state boards established for the purpose of keeping out undesirables—and if so, which dentists are considered undesirable? Does acceptance depend on a man's race or creed in our democratic country?

In my opinion there are only two or three states which refuse to be admitted into a reciprocity agreement because they are afraid they will be overrun by dentists who wish better climates or who want to retire after a few years of practice in a lucrative spot. This is nonsense; there must be some way to overcome that obstacle.

There should be one national board. Let the dentists fall where they may. I feel that there would be a better distribution of dentists throughout the country once the barrier is removed.

Jules Abbott, D.D.S., Walden, N. Y.

LOCAL USE OF CHLORAMPHENICOL

Your recent editorial, "Better Safe Than Sorry,"[1] criticizes a method of endodontic treatment with chloramphenicol suggested by Bender and Seltzer.[2]

Since you have taken a definite stand as a result of a general directive issued by the Food and Drug Administration concerning the use of chloramphenicol, we took the liberty of communicating with Dr. Kerlan, acting head of the F.D.A. Following are copies of an inquiry that we sent to him and a reply we recently received:

"Dear Dr. Kerlan:

"We are well acquainted with the directive issued by the F.D.A. on August 14, 1952 concerning the limited use of chloramphenicol.

"We would like to ask your stand, however, on the local use of chloramphenicol in root canal therapy. We are enclosing a reprint that will acquaint you with the amount and procedures that are used in this type of treatment.

"We wish to add that the volume of the root canal has been found to be about 0.025 ml. Therefore, the greatest amount of chloramphenicol that could be present in the canal would be about 5 mgms. Only a small amount of that could come in contact with vital tissue by accident, not by intent, since we are only interested in sterilizing the inner walls of the root canal. When the medicament is applied, the root canal is devoid of blood, lymph and nerve tissue. It is completely hollow. The inside of a root canal is similar to a test tube that has one or two minute openings.

"While it is true that other antibiotics could be substituted, they lack the stability of long 'shelf life' that chloramphenicol possesses.

"It may also be added that prior to the use of antibiotics in root canal therapy the following irritating and toxic drugs were used as a means of sterilization without any known toxic manifestations: arsenic, formocresol, iodine, sulphuric acid, creosote and a host of other compounds similar in nature. It could be safely stated that more of the standard germicides are used than antibiotics.

"While we agree wholeheartedly that extreme care should be taken in the use of potent drugs such as chloramphenicol, by mouth or intravenously, we would like your opinion concerning the limited use of the antibiotic in question in root canal therapy.

"There seems to be a feeling by some of making your directive directly applicable even to this limited use of chloramphenicol."

The following is the F.D.A. reply to the above letter:

"We have no evidence to indicate that the few milligrams of chloramphenicol employed in this manner would be harmful to the hematopoietic tissues. All of the reports we have reviewed and other published case reports on the production of blood dyscrasias by chloramphenicol involved its systemic use. The topical forms of the drug-ointment and ophthalmic solution were not associated with this adverse effect."

We believe that it is only fair to publish these communications so that your readers can judge for themselves.

I. B. Bender, D.D.S., and Samuel Seltzer, D.D.S., Philadelphia

1. Better safe than sorry: no place for doubtful drugs in dental practice. Editorial. J.A.D.A. 45:474 (Dec.) 1952.

2. Bender, I. B., and Seltzer, Samuel. Combination of antibiotics and fungicides used in treatment of the infected pulpless tooth. J.A.D.A. 45:293 (Sept.) 1952.

FINANCIAL ADVICE FOR THE DENTIST'S FUTURE

In the fall of 1929, I was caught in the whirlpool of get-rich-quick schemes. The most popular was the stock market, where one could buy shares of any stock, good or bad, on a 10 per cent margin. The bank or broker who advanced 90 per cent of the balance kept the stock. The speculator received dividends and all accrued benefits, although he owned the stock only on margin.

Everyone played the market. My bootblack, my banker, my waiter and my janitor owned shares. It was a glorious period of stock market inflation—those years between 1924 and the fall of 1929. "Get rich" was the motto all around the country.

But everything must come to an end. The merry-go-round of wealth flowing to all, rich or poor, stopped. The collapse came—the Big Stock Market Crash of 1929. Over night millionaires were rendered penniless. The shoeshine man, the barber, the waiter, the janitor, all of us—yes, even I—went broke.

It was a frightful period, and it leaves an indelible impression on one's mind. When I reflect back to 1929, I wish I had taken the advice of an old banker friend of mine in those days. He knew I was playing the market and cautioned me not to continue. He suggested that if I wanted to buy stocks and speculate, why didn't I invest only a small part of my capital in stocks, and invest the rest proportionately in life insurance, annuities, government and industrial bonds, savings banks and so forth.

He wanted me to own several things; if one or two went sour, at least the others would be good, and in this manner I couldn't go broke. I, like thousands of others, was too smart to take this old "Yankee thrift" advice.

History may repeat itself. Today we are witnessing the longest and greatest boom period in American history. Never has the commodity market been so highly inflated. Some of our members of Congress are trying to point out that the threat of an imminent war with Russia is not so dangerous to the financial health of America as is the present state of inflation.

Dentistry today is not only a profession but a business. For many it is big business; witness the many dentists in your own circle who are financially successful. Others just get by; they never learned to make "big money." But it is to the large number of dentists who make an honest and comfortable living that I have primarily written this message. To them I have this advice to offer:

If you own any common stock, own it outright, not on margin. Buy only seasoned stocks which are showing progress in earning and which have good dividend records. Any good statistical house in the financial district of your own city will advise you as to which good stocks to purchase. Own, also, life insurance protection for your family; annuities, protection for you. Purchase also cooperative bank shares.

I am no "financial wizard" but like many others who were badly burned in a financial crisis, I am gladly passing on this bit of advice to all in my profession, in the hope that—even if only one reader will reap some financial security from it—it will have been worth the writing.

Charles A. Levinson, D.M.D., Boston

Book Reviews

OLD INSTRUMENTS USED FOR EXTRACTING TEETH

By Sir Frank Colyer. 246 pages with 283 illustrations. Bibliography. Index. Price $8.50. London and New York, Staples Press, 1952.

Sir Frank Colyer has encompassed within a small book of 246 pages an exhaustive study of all types of extraction instruments employed professionally from earliest times to the early nineteenth century. The chapter titles list pelicans, elevators, keys, modified forms of the key, screws, forceps, and instruments for the perpendicular extraction of teeth. The numerous illustrations (283), the descriptions of instruments, and the extensive bibliography in this book furnish all the data that any student of the history of extraction should need concerning the instruments employed.

The work is not, however, a complete history of the removal of teeth, for it makes no attempt to deal with the circumstances in which these instruments were used, the reasons for one instrument's superseding another, and the effect of the introduction of anesthesia on extraction technic and instruments. Only to a limited extent does it deal with the technic of using the instruments, their advantages and their shortcomings. However, the author has completed the task which he set for himself, and the book cannot be too highly praised as a definitive account.

Very little helpful information has been omitted. Since illustrations are of the utmost importance, the failure to include Andrée's diagram showing the mechanics of the pelican and of the key in use (1784) may be regretted. Also Aitken's quaint illustration of the application of the key (1771) would have been very welcome. Plates showing the beaks of Cyrus Fay's "anatomical" forceps and the beaks of Josiah Flagg's "anatomical" forceps merit inclusion. Fox's engravings depicting the right and the wrong ways to use the key and his cuts illustrating the extraction of the third molar, the first molar, and the bicuspid by means of the key would have cleared up those points.

To the extensive bibliography might well have been added the following: the excellent article by L. Molnar, "Über die Entwicklung der Zahnextractionsinstrumente," in *Correspondenz-Blatt für Zahnärzte*, 52:341, 395 (1928); the section of Karl Sudhoff's *Beitrage zur Geschichte der Chirurgie* (1914-1918) dealing with the origin of the pelican and *überwurf;* Maurice Fay's article on the forceps of Cyrus Fay, in *Bull. Soc. Française d'Hist. Méd.*, 2:174 (1903); and Josiah Flagg's article on the forceps of his design, in *Medical Magazine* (Boston), 3:154 (1834).

The reviewer disagrees with the author on one point. The pelican and *überwurf* (in French, *levier droit)* have a close superficial resemblance to each other, but in their mechanical operation they are quite distinct and should not be confused, as in many cases they are in the legends of illustrations in the text. The hook-arm of the pelican swung in a horizontal plane and the bolster was placed against some tooth other than that to be extracted; with the *überwurf*, the hook-arm swung in a vertical direction, with the hook in line with the shaft when in use, and the bolster was placed on the ridge at the base of the tooth to be extracted. Counterparts of both these instruments are to be found in different types of the cooper's tool from which their design was probably adapted.

George B. Denton.

TERATOMAS

By Rupert A. Willis. 58 pages with 45 illustrations, one in color. No index. Price 50 cents. Washington, D. C., Armed Forces Institute of Pathology, 1951.

This monograph is in fact one chapter in an outstanding publication covering the whole subject of tumors. The publication, *Atlas of Tumor Pathology*, is a project of the National Research Council, working through appropriate committees, and is published by the Armed Forces Institute of Pathology. The project has the support of the American Cancer Society, Anna Fuller Fund, Armed Forces Institute of Pathology, Jane Coffin Childs Memorial Funds, National Cancer Institute, U. S. Public Health Service and the Veterans Administration.

The scope and magnitude of the project is beginning to take form; it will certainly run to many volumes and spread over at least one shelf of a modest library. The booklets in the series are perforated for loose-leaf binding and are paper covered.

The illustrations are the finest that modern technical methods can achieve and each, whatever its source, has been given an accession

number of the Armed Forces Institute. Many, but not all, are from the specimens in the collections of the Institute.

The booklet on teratomas contains text and illustrations dealing with the teeth found in tumors. In all essential respects, the teeth found in ovarian teratomas (dermoid cysts) and other teratomas do not differ from normal oral cavity teeth, although they are malformed and only partially developed. Because of these anomalies it is regrettable that neither the illustrations, nor the text, nor the references are complete. Some of the items not covered are: the structures of the periodontal membrane, the process of absorption of teeth analogous to deciduous teeth, the relationship of the enamel cap of the crown to the cementum of the root and the presence of enamel lamellae in the enamel cap. The last item may have something to do with current discussions of the pathology and genesis of dental caries.

There are a number of articles in the literature pertinent to that subject that, it seems, should have been included in the bibliography. Each monograph contains a limited list of publications used in its preparation. There is no doubt as to the significance and value of this Atlas; it is priceless and will be a "must" in any dental and medical library.

Edward H. Hatton

ANESTHESIA IN DENTAL SURGERY

By Sterling V. Mead. Second edition. 648 pages with 212 illustrations. Index. Price $12.50. St. Louis, C. V. Mosby Co., 1951.

This fine book on anesthesia in dental surgery is divided into three main parts and further into 37 chapters. The first three chapters cover general phases of the subject, including an excellent presentation of teaching and research in general anesthesia. Here the author indicates a belief in fitness and training as requisites for one who administers anesthetics, even more to the point than a medical degree. Apparently, he also believes that no routine physical examination can replace information which may be gained by an alert and keen practitioner while taking a medical history. Rightly he stresses the importance of close cooperation with physicians.

Parts two and three are concerned with local and general anesthesia. Here the aim has been to approach the subject from the standpoint of both the student and the practitioner. It contains information indispensable to the training of the beginner and presents it in a form that is just as useful to the practitioner, especially the one who is somewhat removed in time from his student days and relatively uncertain about the newer methods in anesthesia.

A good index helps the practitioner find information, and the many suggestive illustrations are most helpful in presenting the subject under discussion. Students will appreciate the numerous occasions when the text is broken up into numbered items, a great aid to the learner, especially in preparing for his various examinations.

As the first edition of this work came out in 1935, the new version contains much valuable new material, particularly in the fields of intravenous and inhalation anesthesia and such subjects as premedication and physiology. Each chapter is followed by a table of very useful references for those who wish to consult the original writers and research studies used in the preparation of this book.

This volume must be considered as absolutely essential on the library shelf of both student and practitioner and should be kept within arm's reach, so to speak.

Edward H. Hatton

DENTISTRY FOR CHILDREN

By John C. Brauer, William W. Demeritt, L. B. Higley, Maury Massler and Isaac Schour. Third edition. 454 pages with 263 illustrations and 19 tables. Index. Price $10. New York, The Blakiston Co., 1952.

This is the third edition of a book first published in 1939 and revised in 1947 by John C. Brauer, a man who has not only seen the practice of dentistry for children "grow up," but also has played a large part in its development.

As in earlier editions, the book is divided into two sections: one covering the theoretical considerations and the other, the technical procedures. The new edition provides several welcome changes and additions in both parts. The chapter on "Dental Caries" by Maury Massler has been rewritten so as to present a clear, up-to-date discussion of this disease which accounts for the majority of the dental problems of children. Also, Dr. Brauer has included a number of better illustrations of operative dentistry for deciduous teeth in chapter 13 and has added a discussion of deciduous anterior tooth replacement which, although not generally accepted, deserves consideration in any treatise on space retention. Other refinements and additions have been included in the text of the book.

The largest addition to Part II is the chapter on "Removable Denture Prosthesis" writ-

ten by W. W. Demeritt. This is well organized and is quite complete, leaving out a lot of the unnecessary details of laboratory technics. The appliances described are those which have been successfully used with children patients not only by Dr. Demeritt but also by two of his former associates, Francis Summers and C. Thomas Havey, to whom Dr. Demeritt is indebted for the excellent illustrations.

In summary this text provides an up-to-date discussion of dentistry for children that is neither too cursory nor too involved. A student or a dentist in practice will not only enjoy reading it but will benefit from doing so. It should be considered a necessity for the library of those especially interested in this important phase of dental practice.

Gordon H. Rovelstad

DENTAL PRACTICE MANAGEMENT

By S. L. Drummond-Jackson. Third edition. 357 pages with 85 illustrations. Bibliography and index. Price $6. New York, Staples Press, 1952.

The dentist who wants to acquire a sound knowledge of practice management will find in this book a clear, thorough and well organized treatise concerning the many economic problems with which dentists are confronted.

The author states that a dentist should expect "To live and work in reasonable comfort; to consolidate his finances to tide over emergencies; to bring up and educate a family; to take an adequate vacation each year without worry and to provide for his retirement."

The first chapters are presented in logical sequence and begin with the first steps in entering practice. The author covers in an adroit manner house surgeonship, temporary assistantship, assistantship with a view to partnership and choice of locale.

One of the most interesting chapters in the book is that on planning, furnishing and decorating the office; 25 illustrated pages are devoted to a detailed description of floor plans, equipment distribution and so forth, which provide for maximum efficiency and minimum waste space.

The discussion in Chapter VI on income tax, expenses and insurance is particularly cogent; many savings may be realized if the author's suggestions are heeded.

Succeeding chapters are devoted to appointments; advice to denture patients; quotations and fees; patients' records; office records; promoting growth; recall systems; settings; training the surgery assistant; laboratory administration; children and staff. Appendix I presents a guide for professional conduct; Appendix II, stock lists.

It would seem from the final listing of subjects that a lack of continuity is evident, but a thorough perusal of the complete text is necessary in order to derive the greatest value from it.

One particular section of Chapter XIV, entitled "Two Year Maintenance Service," could lead to considerable controversy. Although the author states that the word "guarantee" is unethical and should not be used, he advocates a free service covering two years, for the repair and replacement of all work except that which is specifically excluded at the time of treatment. The author claims that if a maintenance service is operated fairly and with discretion, it will enhance the dentist's prestige, increase confidence, retain patients who might otherwise leave the practice, facilitate collection of accounts and bring much extra remunerative work to the office.

All in all, the book contains much that is excellent, reflects considerable thought and study and fills a definite need in today's dental literature. The author deserves commendation for providing a treatise of distinction and clarity on a very timely subject.

Lloyd H. Dodd

ORAL SUGAR CLEARANCE, ITS INFLUENCE ON DENTAL CARIES ACTIVITY

By Claes Lundqvist. Translated by C. M. Evans. The Lund Dental Research Station of the Royal Medical Board of Sweden and the Royal University of Lund, Sweden. 121 pages with 13 figures and 36 tables. No price listed. Lund, Sweden, Berlingska Boktryckereit, 1952.

This book is a report on part of the excellent, coordinated research program sponsored by the Royal Medical Board of Sweden. After a rather comprehensive review of the literature the author concludes that his portion of the research program should concern the following factors in relation to dental caries: (1) Does the saliva normally contain sugar? (2) Does dental caries have any bearing on or relation to the oral sugar clearance? (3) Is there a difference in sugar clearance between various foods? (4) Is it possible to influence the sugar clearance by oral hygiene measures? The author describes in detail the various procedures and results of some excellent experiments designed to evaluate these factors.

On the basis of the experiments performed the author furnishes evidence that normal saliva from fasting individuals is sugar-free.

It was further shown that even in cases of hyperglycemia, sugars are not secreted in saliva. It was established that all of the sugar found in the saliva consists of the residue left from the food of the diet. A rough correlation was found between the sugar clearance time of the oral cavity and caries activity. Caries activity was found to be generally intensified with an increase in the sugar clearance time. A high sugar concentration in the saliva in conjunction with a prolonged clearance time usually was associated with increased caries activity. A graded comparison of the sugar clearance of customary foods showed that honey, candy and sweetened breads showed the highest caries potentiality. A simple rinsing of the mouth with water immediately after the ingestion of foods was found to be quite effective in reducing sugar clearance time.

The experiments were well planned and accurately performed, and the description of the methods and the results is clear and well written. The book is a valuable contribution to the research in dental caries.

L. S. Fosdick

LEITFADEN DER ZAHNÄRZTLICHEN CHIRURGIE

By Georg Axhausen. 243 pages with 227 illustrations, colored in part. Price 18.— D.M. Munich, Carl Hanser Verlag, 1950.

The author has subtitled his book "Introduction to Clinical Dentistry for Students of Medicine and Dentistry in 16 Lectures." He recognizes the difficulty this involves, for the dentist may consider the dental parts elementary while the physician may consider some clinical explanations too brief. They are intended as introductions and only the material most useful to both groups is included.

The book may be considered as a supplement to the author's "Allgemeinen Chirurgie." The illustrations form a very valuable adjunct to the text, which is divided into two parts. The first or clinical part consists of 135 pages and 11 lectures devoted to the following topics: the systematic examination, pyogenic infections, "putrid" infections in periodontal diseases, ankylosis and anomalies of the dentition, injuries to the teeth and replantation of the teeth, jaw fractures and treatment and a variety of pathological conditions of the oral cavity. The technical part is divided into five lectures covering 75 pages, which include discussions of anesthesia and asepsis, extractions and accompanying complications, forced movement of the teeth and forced eruptions of the teeth by surgery, apicoectomies and removal of cysts. The last lecture covers such procedures as the treatment of acute abscesses and gingivectomies.

D. Washburn

SCHOOL HEALTH AND HEALTH EDUCATION

By C. R. Turner. Second edition. 472 pages with 8 tables and 12 illustrations. Index. Price $3.50. St. Louis, C. V. Mosby Co., 1952.

This should prove to be a valuable textbook and reference for dental hygiene teachers, health educators, nurses and any person working in or with a health education program. Its use in teacher training institutions as a reference for student teachers might help to overcome some of the woeful ignorance of many teachers about the importance of health education and the application of their knowledge of methodology to the teaching of health.

There is a good discussion of the problem of dental defects, but one broad statement might be questioned: "the number of children with serious dental defects has been greatly reduced from that of a generation ago." It would be preferable to add to the above, the statement "where a good dental program of education and service has been in effect."

Although this book has little practical application in the daily routine of the general dental practitioner, it is to be highly recommended to all interested in or pursuing the activities involved in health education. In Chapter II we find a statement which should interest every clinician doing school work: "The work of the physician, dentist and nurse in the school determines, in large measure, the pupil attitude toward medical service. . . . The quality of the services in health examinations, follow-up, and communicable disease control is thus important to education as well as to health."

To the dental hygienist or dental hygiene teacher we would recommend Chapter 19, "Criteria for Evaluating Textbooks and Supplementary Source Material." Especially is this valuable to the girl who is attempting to do class work without the benefit of any formal training in pedagogy.

The last chapter quite properly considers the difficult problem of evaluating any health education program. Suggestions as to possible questions which should be considered in evaluation are included and might be useful.

H. Shirley Dwyer

Deaths

Gable, John C., Woodward, Iowa; College of Dentistry, University of Iowa, 1898; died November 3; aged 74.

Gordon, John B., Tulsa, Okla.; Indiana Dental College, 1918; died November 9, aged 57.

Gunther, Frank M., Chicago; Dental School, Northwestern University, 1923; died December 8.

Harrold, J. Wiler, Hillsboro, Ohio; School of Dentistry, Indiana University, 1929; died November 16; aged 46.

Hinkson, George W., Philadelphia; Philadelphia Dental College, 1898; died November 25; aged 78.

Hoban, Dennis M., Plains, Pa.; died November 16.

Houghton, Z. B., Marion, Ohio; Ohio College of Dental Surgery, University of Cincinnati, 1901; died July 25; aged 77.

Hutchins, James H., Marshall, N. C.; Atlanta Dental College, 1914; died November 18; aged 63.

Hyde, Frank N., Detroit; died October 30; aged 75.

Jones, Edward P., Rochester, N. Y.; School of Dentistry, University of Buffalo, 1900; died November 2; aged 74.

Keidel, Felix, Fredericksburg, Texas; Baltimore College of Dental Surgery, 1904; died November 8; aged 69.

Kelly, John J., Brooklyn; College of Dental and Oral Surgery, New York, 1916; died November 24.

Kunz, Val, St. Louis; School of Dentistry, Washington University, St. Louis, 1904; died November 3; aged 72.

Lascell, Ernest R., Hallandale, Fla.; School of Dentistry, University of Buffalo, 1903; died July 6; aged 71.

Leunig, Irvin A., Belleville, Ill.; School of Dentistry, Washington University, St. Louis, 1911; died October 24; aged 66.

Lewis, William C., Harrisburg, Pa.; School of Dentistry, University of Pittsburgh, 1907; died April 20.

Liberman, Hyman L., Rochester, N. Y.; School of Dentistry, University of Buffalo, 1924; died October 22; aged 50.

Lindemuth, C. Lloyd, Mechanicsburg, Pa.; School of Dentistry, University of Pennsylvania, 1917; died August 6; aged 58.

Linderholm, Elmer S., Denver; School of Dentistry, University of Denver, 1921; died November 2; aged 54.

Loftus, Edward T., Boston; died September 18; aged 67.

Lyle, William M., Durango, Colo.; College of Dental Surgery, University of Michigan, 1902; died July 26; aged 78.

Lynn, Austin A., Marshalltown, Iowa; Dental School, Northwestern University, 1901; died October 15; aged 74.

Maas, Leonard J., Chicago; died June 5.

Mainwold, Herman, Brooklyn; College of Dental and Oral Surgery, New York, 1913; died October 3; aged 65.

Malone, Samuel E., Goldsboro, N. C.; Atlanta Dental College, 1905; died September 29; aged 79.

Mann, Thomas S., St. Johns, Mich.; College of Dental Surgery, University of Michigan, 1896; died October 26; aged 85.

Martin, Carl B., Fairfield, Ill.; School of Dentistry, St. Louis University, 1950; died October 7; aged 31.

Marven, George H., Hollywood, Calif.; Baltimore College of Dental Surgery, 1899; died September 23; aged 76.

Masiello, Frank J., Rochester, N. Y.; Faculty of Dentistry, University of Toronto, 1929; died October 4; aged 46.

Mathews, Howell T., Fort Lauderdale, Fla.; Atlanta Dental College, 1909; died October 26; aged 64.

Matthews, Robert L., St. Paul; College of Dentistry, University of Minnesota, 1912; died October 14; aged 65.

McCall, Moses T., Rome, Ga.; Atlanta Dental College, 1909; died November 5.

McCaughley, Michael J., Brooklyn; School of Dentistry, University of Pennsylvania, 1914; died October 31; aged 70.

McCray, Bernard V., Richmond, Va.; Dental Department, University College of Medicine, Richmond, 1902; died July 21; aged 77.

McGovern, Lawrence P., Lynn, Mass.; Dental Department, Baltimore Medical College, 1909; died November 12; aged 71.

McGrath, John F., Ansonia, Conn.; Indiana Dental College, 1902; died September 25; aged 82.

McIntosh, Arthur H., Harwichport, Mass.; Dental School, Tufts College, 1906; died September 16; aged 75.

McIntosh, Walter S., Wellman, Iowa; College of Dentistry, University of Iowa, 1904; died November 5.

Miller, Benjamin F., Trenton, N. J.; School of Dentistry, University of Pensylvania, 1929; died October 28; aged 46.

Millett, Eli F., Springfield, Mass.; School of Dentistry, University of Pennsylvania, 1907; died November 16.

Moore, J. Nolen, Fayetteville, Ark.; Kansas City, Western Dental College, 1900; died August 5; aged 82.

Moore, Oscar L., Lenoir, N. C.; Baltimore College of Dental Surgery, University of Maryland, 1909; died October 31; aged 67.

Moore, William F., Buford, Ga.; Atlanta-Southern Dental College, 1927; died September 20; aged 62.

Morris, Roy D., Red Oak, Iowa; Omaha Dental College, 1902; died September 27; aged 74.

Mras, Thomas J., Hazleton, Pa.; Dental School, Temple University, 1926; died September 23; aged 49.

Mumma, Harvey G. Lewistown, Pa.; Dental School, Temple University, 1908; died September 5.

Munson, Earle W., Gardner, Mass.; Dental School, Harvard University, 1919; died November 14; aged 65.

Muntz, Emanuel, Buffalo; School of Dentistry, University of Buffalo, 1899; died October 13; aged 84.

Murphy, Jere W., San Angelo, Texas; Atlanta Dental College, 1912; died May 11; aged 65.

Murray, James E., Denver; Dental School, Northwestern University, 1906; died September 25; aged 80.

Myers, Thomas R., Libertytown, Md.; Baltimore College of Dental Surgery, University of Maryland, 1903; died April 7; aged 73.

Newbury, Wallace J., Burlington, Wis.; Dental School, Northwestern University, 1922; died November 10; aged 52.

Perlis, Moe S., Detroit; College of Dental Surgery, University of Michigan, 1918; died November 14; aged 63.

Racette, Felix A., Paw Paw, Mich.; Chicago College of Dental Surgery, Loyola University, 1911; died October 16; aged 67.

Rankin, J. Maude, Richmond Hill, N. Y.; Philadelphia Dental College, 1894; died August 20; aged 84.

Renoe, William H., Fulton, Mo.; Baltimore College of Dental Surgery, University of Maryland, 1894; died November 2; aged 92.

Rice, Walter B., Columbus, Ohio; College of Dentistry, Ohio State University, 1944; died November 11.

Richmond, John E., Eugene, Ore.; Dental School, Northwestern University, 1907; died September 25; aged 70.

Riggs, Walter C., Brooklyn; New York College of Dentistry, 1899; died April 27; aged 77.

Rightman, Simon M., Chicago; Dental School, Northwestern University, 1907; died November 13.

Rodbard, Charles F., Philadelphia; Philadelphia Dental College, 1894; died November 2; aged 80.

Rogers, Roger G., Creedmoor, N. C.; Dental Department, University College of Medicine, Richmond, 1907; died September 5; aged 70.

Rosen, Abraham, New York; New York College of Dentistry, 1919; died August 18; aged 55.

Rubricius, Frank I., New York; New York College of Dentistry, 1911; died September 2; aged 69.

Russell, John H., Providence, R. I.; Dental School, Harvard University, 1905; died November 14; aged 78.

Rutledge, James A., Okolona, Miss.; Atlanta Dental College, 1907; died November 9; aged 71.

Schneider, William B., Placerville, Calif.; College of Dentistry, University of California, 1930; died October 29.

Schrecker, Franz, New York; School of Dentistry, University of Pittsburgh, 1942; died September 16; aged 55.

Scott, Colburn H., West Springfield, Mass.; Dental School, Tufts College, 1915; died September 27.

Sewall, Lewis A., Tulsa, Okla.; Dental Department, Meharry Medical College, Nashville, 1929; died in September.

Shafor, Calvin L., Detroit; College of Dentistry, Ohio Medical University, 1903; died October 22; aged 73.

Sibley, Henry R., Haverhill, Mass.; Dental School, Tufts College, 1914; died September 22; aged 60.

Smith, Ernest R., St. Paul; Dental School, Northwestern University, 1901; died August 27; aged 73.

Smith, Ferris E., Point Pleasant, W. Va.; School of Dentistry, University of Pittsburgh, 1926; died November 10; aged 49.

Smith, John R., Zanesville, Ohio; Cincinnati College of Dental Surgery, 1913; died October 30; aged 67.

Smith, Shobe S., Dresden, Tenn.; Dental Department, Meharry Medical College, Nashville, 1924; died September 25.

Sniveley, Charles L., Newark, N. J., Baltimore College of Dental Surgery, University of Maryland, 1905; died November 11.

Snyder, Roscoe F., Kalamazoo, Mich.; Dental School, University of Michigan, 1932; died October 15; aged 45.

Solinski, Aloysius J., Cleveland; School of Dentistry, Western Reserve University, 1922; died November 14; aged 58.

Directory

OFFICERS

Otto W. Brandhorst, President.....4952 Maryland Ave., St. Louis
Leslie M. FitzGerald, President-Elect.....718 Roshek Bldg., Dubuque, Iowa
Henry F. Westhoff, First Vice-President.....Missouri Bldg., St. Louis
F. A. Pierson, Second Vice-President.....1112 Federal Securities Bldg., Lincoln, Neb.
John A. O'Keefe, Third Vice-President.....1801 K St., N.W., Washington, D. C.
Harry Lyons, Speaker, House of Delegates...School of Dentistry, Medical College of Virginia, Richmond, Va.
Harold Hillenbrand, Secretary.....222 E. Superior St., Chicago
C. Willard Camalier, Assistant Secretary.....1726 Eye St., N.W., Washington, D. C.
Louis M. Cruttenden, Assistant Secretary.....222 E. Superior St., Chicago
H. B. Washburn, Treasurer.....Lowry Medical Arts Bldg., St. Paul
Lon W. Morrey, Editor.....222 E. Superior St., Chicago

BOARD OF TRUSTEES

Earl G. Jones, 1955, Seventh District.....185 E. State St., Columbus, Ohio
A. F. Schopper, 1955, Sixth District.....914 Professional Bldg., Kansas City, Mo.
Charles I. Taggart, 1955, First District.....139 Bank St., Burlington, Vt.
Lewis W. Thom, 1955, Tenth District.....1546 Medical Arts Bldg., Minneapolis
William R. Alstadt, 1954, Twelfth District.....610 Boyle Bldg., Little Rock, Ark.
Bernerd C. Kingsbury, 1954, Thirteenth District.....490 Post St., San Francisco
Percy T. Phillips, 1954, Second District.....18 E. 48th St., New York
Clarence S. Renouard, 1954, Eleventh District.....304 Phoenix Bldg., Butte, Mont.
W. Earle Craig, 1953, Third District.....8113 Jenkins Arcade, Pittsburgh
L. H. Jacob, 1953, Eighth District.....Jefferson Bldg., Peoria, Ill.
James E. John, 1953, Fifth District.....Medical Arts Bldg., Roanoke, Va.
Daniel F. Lynch, 1953, Fourth District.....1678 Primrose Road, N.W., Washington, D. C.
Obed H. Moen, 1953, Ninth District.....Watertown, Wis.

BUREAUS

Economic Research and Statistics: B. D. Moen, Director, 222 E. Superior St., Chicago
Library and Indexing Service: Donald A. Washburn, Director, 222 E. Superior St., Chicago
Public Information: Herbert B. Bain, Director, 222 E. Superior St., Chicago

COUNCILS

Constitution and Bylaws: Max E. Ernst, Chm., Lowry Medical Arts Bldg., St. Paul
Dental Education: B. L. Hooper, Chm., 1004 Sharp Bldg., Lincoln, Neb.
Shailer Peterson, Secy., 222 E. Superior St., Chicago
Dental Health: David W. Brock, Chm., 6026 Enright Ave., St. Louis 12
Allen O. Gruebbel, Secy., 222 E. Superior St., Chicago
Dental Museum and Registry: Henry A. Swanson, Chm., 1726 Eye St., N.W., Washington, D. C.

Dental Research: M. K. Hine, Chm., 1121 W. Michigan St., Indianapolis

Dental Therapeutics: Thomas J. Hill, Chm., 2085 Adelbert Road, Cleveland
J. Roy Doty, Secy., 222 E. Superior St., Chicago

Dental Trade and Laboratory Relations: F. W. Herbine, Chm., 230 N. Fifth St., Reading, Pa.
Bernard J. Conway, Secy., 222 E. Superior St., Chicago

Federal Dental Services: R. H. Friedrich, Chm., 960 Park Ave., Plainfield, N. J.
Bernard J. Conway, Secy., 222 E. Superior St., Chicago

Hospital Dental Service: Frank B. Hower, Chm., 814 Heyburn Bldg., Louisville, Ky.
Gerard J. Casey, Secy., 222 E. Superior St., Chicago

Insurance: Paul W. Zillmann, Chm., 29 Walden Ave., Buffalo

International Relations: O. A. Oliver, Chm., 1915 Broadway, Nashville, Tenn.

Journalism: W. L. Barnum, Chm., Morgan Bldg., Portland, Ore.

Judicial Council: H. B. McCarthy, Chm., College of Dentistry, Baylor University, Dallas, Texas

Legislation: E. Harold Gale, Chm., 142 Washington Ave., Albany, N. Y.
Francis J. Garvey, Secy., 222 E. Superior St., Chicago

Membership: J. R. Wallace, Chm., 31 Church St., Winchester, Mass.

National Board of Dental Examiners: G. L. Teall, Chm., P. O. Box 71, Hiawatha, Kan.
Gerard J. Casey, Secy., 222 E. Superior St., Chicago

Relief: Leo W. Kremer, Chm., 1725 S. E. 13th St., Fort Lauderdale, Fla.
M. C. Hansen, Secy., 420 Seventh St., Racine, Wis.

Scientific Session: William A. Garrett, Chm., Candler Bldg., Atlanta, Ga.

SECTION CHAIRMEN

Operative Dentistry: Miles R. Markley, 632 Republic Bldg., Denver

Oral Surgery and Anesthesia: Irwin T. Hyatt, 56 Fifth St., N.E., Atlanta, Ga.

Orthodontics and Oral Development: Robert M. Ricketts, 15247 Sunset Blvd., Pacific Palisades, Los Angeles

Pedodontics: Harold K. Addelston, 424 Madison Ave., New York

Periodontics: B. O. A. Thomas, School of Dentistry, University of Washington, Seattle

Practice Management: Ralph H. Campbell, 4741 Spokane Ave., Detroit

Prosthodontics, Complete Dentures: Frank M. Kyes, U. S. Naval Amphibious Base, Little Creek, Norfolk, Va.

Prosthodontics, Partial Dentures: Chester M. Perry, 16350 E. Warren Ave., Detroit

Public Health Dentistry: Milton E. Nicholson, 609 Shields Bldg., Pittsburgh

Research: H. B. G. Robinson, School of Dentistry, Ohio State University, Columbus, Ohio

Roentgenology: H. Cline Fixott, Jr., 308 Selling Bldg., Portland, Ore.

THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION
222 East Superior Street, Chicago 11, Illinois
WHitehall 4-6730

LON W. MORREY, *Editor* JOHN J. HOLLISTER, *Business Manager*

All expressions of opinion and all statements of supposed fact are published on the authority of the writer over whose signature they appear and are not to be regarded as expressing the views of the American Dental Association, unless such statements or opinions have been adopted by the Association. *Articles* are accepted with the understanding that they have not been published previously and that they are submitted solely to THE JOURNAL. *Advertising copy* must conform to the official standards established by the American Dental Association. *Notice of change of address* should be received one month before the change is to be effective. *Orders for reprints of* JOURNAL articles must be received by the Business Manager's office not later than the 15th of the month of issue in order to secure advantage of the lowest possible prices. Orders received after this date are subject to special quotation.

Announcements

MEETINGS OF THE AMERICAN DENTAL ASSOCIATION

Ninety-Fourth Annual Session	Sept. 28-Oct. 1, 1953	Cleveland
Ninety-Fifth Annual Session	Nov. 8-11, 1954	Miami
Ninety-Sixth Annual Session	Oct. 17-20, 1955	San Francisco

MEETINGS OF STATE SOCIETIES

State	Date	Place	Secretary	Address
Alabama	Apr. 9-11	Montgomery	F. A. Finney, Jr.	1045 Forrest Ave., Gadsden
Alaska	July 12-16	Juneau	J. D. Smith	Box 134, Juneau
Arizona	Apr. 23-25	Tucson	E. M. Scott	17 E. Weldon Ave., Phoenix
Arkansas	Apr. 5-8	Little Rock	D. M. Hamm	White Bldg., Clarksville
California	Apr. 13-15	San Francisco	L. R. Ludwigsen	450 Sutter St., San Francisco
S. California	Apr. 20-22	Los Angeles	C. A. Moss	903 Crenshaw Blvd., Los Angeles
Colorado	Oct. 4-7	Colorado Springs	W. R. Humphrey	724 Republic Bldg., Denver
Connecticut	May 20-23	Hartford	E. S. Arnold	37 Linnard Rd., W. Hartford
Delaware	Jan. 13, 1954	Wilmington	J. C. Baker	Mayfair Apts. Sec. C, 1300 Harrison St., Wilmington
District of Columbia	Mar. 15-18	Washington	K. H. Wood	202-1835 Eye St., N. W., Washington
Florida	Apr. 19-22	St. Petersburg	C. T. Brown	602 Citizens Bldg., Tampa 2
Georgia	Oct. 18-21	Atlanta	J. W. Yarbrough	Bibb Bldg., Macon
Hawaii	June 24-27	Honolulu	J. H. Dawe	810 N. Vineyard St., Honolulu 17
Idaho	June 28-July 2	Sun Valley	J. F. Julian	206 Rogers Bldg., Idaho Falls
Illinois	May 12-14	Peoria	P. W. Clopper	623 Jefferson Bldg., Peoria 2
Indiana	May 18-20	Indianapolis	E. E. Ewbank	Kingman
Iowa	May 4-6	Des Moines	H. I. Wilson	639 Insurance Exchange Bldg., Des Moines
Kansas	May 10-13	Kansas City, Mo.	F. A. Richmond	861 Brotherhood Bldg., Kansas City
Kentucky	Apr. 7-9	Louisville	A. B. Coxwell	1976 Douglass Blvd., Louisville
Louisiana	Apr. 29-May 2	New Orleans	J. S. Bernhard	2515 Line Ave., Shreveport
Maine	June 25-27	Rockland	S. M. Gower	Box 27, Skowhegan
Maryland	May 4-6	Baltimore	E. L. Pessagno, Jr.	19 Medical Arts Bldg., Baltimore 1
Massachusetts	May 3-6	Boston	H. E. Tingley	12 Bay State Road, Boston
Michigan	Apr. 20-23	Detroit	F. Wertheimer	Michigan Dept. of Health, Lansing
Minnesota			C. V. E. Cassel	242 Lowry Medical Arts Bldg., St. Paul
Mississippi	Apr. 26-29	Jackson	H. M. Campbell	102 Professional Bldg., Tupelo
Missouri	May 10-13	Kansas City	E. D. Suggett	201 Merchants Bank Bldg., Jefferson City
Montana	May 7-9	Missoula	C. S. Renouard	304 Phoenix Bldg., Butte
Nebraska	May 11-13	Lincoln	F. A. Pierson	1112 Federal Securities Bldg., Lincoln
Nevada	May 4, 5	Las Vegas	J. E. Ahlstrom	1150 Arizona, Boulder City
New Hampshire	June 11-14	Bretton Woods	F. E. Williams	814 Elm St., Manchester
New Jersey	Apr. 22-24	Atlantic City	J. G. Carr	407 Cooper St., Camden
New Mexico	May 24-27	Albuquerque	J. S. Eilar	Suite 7, Medical Arts Square, Albuquerque
New York	May 12-15	New York	C. A. Wilkie	1 Hanson Place, Brooklyn
North Carolina	May 17-20	Pinehurst	B. N. Walker	608 Liberty Life Bldg., Charlotte
North Dakota	May 24-27	Fargo	J. H. Lunday	302 Black Bldg., Fargo
Ohio	Nov. 8-11	Columbus	E. G. Jones	185 E. State St., Columbus
Oklahoma	Apr. 19-22	Tulsa	D. Robertson	434 N. W. 13th St., Oklahoma City
Oregon	Mar. 2-4	Portland	H. C. Fixott, Jr.	Medical Dental Bldg., Portland
Panama Canal Zone	Dec. 8	Balboa	C. F. Atkins	U. S. Army Hospital, Fort Clayton
Pennsylvania	May 20-22	Atlantic City, N. J.	M. D. Zimmerman	217 State St., Harrisburg
Puerto Rico			F. Ordoñez	1558 Ponce de León Ave., Stop 23, Santurce
Rhode Island			N. G. Migliaccio	1467 Westminster St., Providence
South Carolina	June 18-24	Caribbean Cruise	J. R. Owings	7 Medical Court, Greenville
South Dakota	May 17-19	Rapid City	E. W. Elmen	Sioux Falls
Tennessee	May 11-14	Knoxville	W. L. McCulley	Brown Bldg., Cleveland

State	Date	Place	Secretary	Address
Texas	May 10-14	Houston	W. Ogle	3607 Gaston Ave., Dallas
Utah	Apr. 27-29	Salt Lake City	K. L. Dedekind	914 Medical Arts Bldg., Salt Lake City
Vermont	May 17-19	Woodstock	W. J. Reardon	Rutland
Virginia	May 4-6	Roanoke	J. E. John	804 Medical Arts Bldg., Roanoke
Washington	June 18-20	Yakima	F. J. Dingler	1502 Medical-Dental Bldg., Seattle
West Virginia	July 19-22	White Sulphur Springs	A. B. Drake	506 West Virginia Bldg., Huntington 1
Wisconsin	Apr. 6-9	Milwaukee	R. A. Mason	964 N. 27th St., Milwaukee
Wyoming		Casper	T. J. Drew	State Office Bldg., Cheyenne

MEETINGS OF STATE BOARDS OF DENTAL EXAMINERS

State	Date	Place	Secretary	Address
Alabama	June 15*	Birmingham	N. E. Allen	Du Bose Bldg., Selma
Alaska	July 6-11	Fairbanks	J. H. Geyer	209 Goldstein Bldg., Juneau
Arizona			R. K. Truehlood	25 N. Second Ave., Glendale
Arkansas	June 22-26	Little Rock	H. O. Weatherly	205 Halter Bldg., Conway
California	July 27	San Francisco	K. I. Nesbitt	507 Polk St., San Francisco 2
	June 22	Los Angeles		
Colorado	June 22-26	Denver	C. K. Phillips	724 Republic Bldg., Denver 2
Connecticut	June 15-20	Bridgeport	C. G. Brooks	302 State St., New London
Delaware	June 29-July 1	Wilmington	P. K. Musselman	143 W. Main St., Newark
District of Columbia	June 1-5	Washington	W. T. Birthright	1835 Eye St., N. W., Washington 6
Florida	July 6-14*	Jacksonville	A. W. Kellner	P. O. Box 155, Hollywood
Georgia	June 8	Atlanta	S. H. Yarbrough	12 Medical Arts Bldg., Columbus
Hawaii			H. L. Houvener	427 Dillingham Bldg., Honolulu
Idaho	June 24-26	Boise	W. K. Adams	1624 Arlington, Caldwell
Illinois	June 23-26	Chicago	W. A. McKee	503 Wood Bldg., Benton
Indiana	June 16-19*	Indianapolis	C. A. Frech	504 Broadway, Gary
Iowa	May 25-29*	Iowa City	H. M. Willits	719 Roshek Bldg., Dubuque
Kansas	June 1-4	Kansas City, Mo.	G. L. Teall	Box 71, Hiawatha
Kentucky	June 8-11	Louisville	R. I. Todd	Western Union Bldg., Richmond
Louisiana	June 1-5	New Orleans	R. C. Steib	833 Maison Blanche Bldg., New Orleans
Maine			R. A. Derbyshire	Box 387, Skowhegan
Maryland	June 8-10	Baltimore	H. Levin	3429 Park Heights Ave., Baltimore 15
Massachusetts	June 15-19†	Boston	R. A. Barrette	Rm. 33 State House, Boston
	June 17-19‡‡			
Michigan	June 8-12	Ann Arbor	J. L. Champagne	3714 W. McNichols Road, Detroit 21
Minnesota	June 15-19	Minneapolis	F. A. Larson	1632 Washington St., N.E., Minneapolis
Mississippi	June 16-18	Jackson	J. C. Boswell	508 Lamar Life Bldg., Jackson
Missouri	June 8-13	St. Louis	R. R. Rhoades	414 Central Trust Bldg., Jefferson City
	June 10-13	Kansas City		
Montana	July 13-16	Helena	V. J. Quinn	301 Phoenix Bldg., Helena
Nebraska	June 8-13	Lincoln	H. E. Weber	1210 Federal Securities Bldg., Lincoln
Nevada	June 1	Reno	G. C. Steinmiller	Suite 6, Masonic Temple, P. O. Box 2473, Reno
New Hampshire	June 19, 20	Boston	D. J. Freese	4 Wall St., Concord
New Jersey	June 29, 30**††	Philadelphia	W. A. Wilson	150 E. State St., Trenton 8
	June 17, 18**	New York		
	July 1-3§	Trenton		
New Mexico	June 22-25	Santa Fe	J. J. Clarke, Sr.	Artesia
New York	June 23-26§	New York Buffalo Albany Rochester Syracuse	D. W. Beier	23 S. Pearl St., Albany 7
	June 18, 19**	New York Buffalo		
North Carolina	June 22-26	Chapel Hill	F. O. Alford	1109 Liberty Life Bldg., Charlotte 2
North Dakota	July 13-17	Fargo	A. B. Crabtree	Ellendale
Ohio	June 18-20‡‡	Columbus	H. B. Smith	346 E. State St., Columbus
	June 22-24**			
	June 20††			
Oklahoma			J. B. Cole	706 Asp St., Norman

*Dentistry and dental hygiene.
**Dental clinical examinations.
†Dental examinations.
††Hygiene clinical examinations.
§Dental written examinations.
‡‡Hygienists' examinations.
‡Hygiene written examinations.

State	Date	Place	Secretary	Address
Oregon	**June 15-18***	**Portland**	**F. L. Utter**	**506 Pioneer Trust Bldg., Salem**
Pennsylvania	June 22-24§‡	Philadelphia and Pittsburgh	A. M. Stinson	Dept. of Public Instruction, Box 911, Harrisburg
	June 25-27**	Philadelphia		
	June 25††	Philadelphia		
Puerto Rico	Sept.	San Juan	L. C. Coll	Box 9156, Santurce
Rhode Island	June 15-17	Providence	F. M. Hackett	267 Academy Ave., Providence
South Carolina	July 1-3	Columbia	T. C. Sparks	1315 Pickens St., Columbia
South Dakota	June 21-24	Sioux Falls	H. T. Aker	Canton
Tennessee	June 15-19	Memphis	F. S. Maxey	804 Bennie Dillon Bldg., Nashville 3
Texas	June 21-28	Dallas	R. T. Weber	312 Capital National Bank Bldg., Austin
Utah	June 27-30	Salt Lake City	E. O. Thompson	915 Medical Arts Bldg., Salt Lake City
	June 1-3			
Vermont	June 22-24	Burlington	F. A. Reid	Windsor
Virginia	June 8, 9†‡	Richmond	J. M. Hughes	715 Medical Arts Bldg., Richmond 19
	June 8-13†			
Washington	June 22-26*	Seattle	T. D. Schimke	662 Paulsen Medical and Dental Bldg., Spokane
West Virginia	June 22-24*	West Liberty	C. A. Laughlin	613 Prunty Bldg., Clarksburg
Wisconsin	June 15-19*	Milwaukee	S. F. Donovan	Tomah
Wyoming			W. A. Hocker	212 O & S Bldg., Casper

MEETINGS OF OTHER ORGANIZATIONS

Name	Date	Place	Secy. or Chm.	Address
Academy of Denture Prosthetics	Apr. 12-19	Los Angeles	I. L. Furnas Secy.	928 Silverado St., La Jolla, Calif.
American Association of Dental Schools	Mar. 23-25	Philadelphia	M. W. McCrea Secy.	Baltimore College of Dental Surgery, Dental School, University of Maryland, Baltimore 1
American Association of Industrial Dentists	Apr. 21-23	Los Angeles	E. R. Aston Secy.	Dept. of Health, Commonwealth of Pennsylvania, Harrisburg, Pa.
American Association of Orthodontists	Apr. 26-30	Dallas, Texas	F. A. Squires Secy.	Medical Centre, White Plains, N. Y.
American Board of Orthodontics	Apr. 22-26	Dallas, Texas	C. E. Martinek Secy.	661 Fisher Bldg., Detroit 2
American Dental Society of Europe	Aug. 4-7	Bergen, Norway	F. D. Derrick Hon. Secy.	140, Park Lane, London W.1, England
Arpa Internationale, Thirteenth Congress	July 13-19	Geneva, Switzerland	J. N. Nally Secy. Gen., Com. on Organization	8, rue de Saussure, Geneva, Switzerland
Berkshire Conference in Periodontology and Oral Pathology	June 14-18	Boston	I. Glickman Dir.	Tufts College Dental School, 136 Harrison Ave., Boston 11
Cincinnati Dental Society	Mar. 22-24	Cincinnati	P. H. McMullen Exec. Secy.	123 E. Sixth St., Cincinnati 2
Council on Dental Education, Dental Aptitude Tests	Mar. 6, 7		S. Peterson Secy.	222 E. Superior St., Chicago 11
Fédération Dentaire Internationale	July 26-Aug. 1	Oslo, Norway	G. H. Leatherman Hon. Secy.	35 Devonshire Place, London W.1, England
International Academy of Anesthesiology	May 13	Washington, D. C.	I. G. Tomack Exec. Secy.	355 E. 149th St., New York
International Academy of Oral Dynamics	Mar. 15	Washington, D. C.	J. J. Greeves Pub. Chm.	1801 K St., N. W., Washington, D. C.
International Association for Dental Research	Mar. 20-22	Philadelphia	E. H. Hatton Secy.	311 E. Chicago Ave., Chicago 11
National Board of Dental Examiners	Apr. 13, 14		G. J. Casey Secy.	222 E. Superior St., Chicago 11
Northeastern Society of Orthodontists	Mar. 9, 10	New York	O. Jacobson Secy.	35 W. 81st St., New York
Pacific Coast Society of Prosthodontists	Apr. 18, 19	Santa Monica, Calif.	A. W. Spaulding Secy.	4350 11th Ave., Los Angeles
Southeastern Society of Oral Surgeons	Mar. 6, 7	Birmingham, Ala.	C. F. Landeis Secy.	316 James Bldg., Chattanooga, Tenn.
Southern Academy of Oral Surgery	Mar. 21, 22	Atlanta, Ga.	R. F. Sullivan Secy.	118 E. Jones St., Savannah, Ga.

ZINC OXIDE

Analytical Reagent grade,
4 oz. Container $1.00

EUGENOL

U.S.P. 1 oz. bottle $1.00

KING'S ALUMINUM SHELL CROWNS

36 gauge, sizes 1-20

Offer temporary protection for crown and bridge work, inlay and cavity preparation. They withstand the pressure needed for plastic filling materials.

Box of 20 ..... $1.50 Utility Case of 100 ..... $6.75

KING'S

Dental Standard

PREPARATIONS

Accepted COUNCIL on DENTAL THERAPEUTICS AMERICAN DENTAL ASSOCIATION

Always Dependable

The medicaments presented in this space are chemical entities . . . not compounded. They are remedies accepted by the Council on Dental Therapeutics of the A.D.A. They are stable and dependable. Order from your dealer.

KING'S SPECIALTY CO., Box 240, Fort Wayne, Indiana

SODIUM FLUORIDE

2% solution, retains pH for a year or more.
8 oz. bottle, $1.50.
Four 8 oz. bottles, $5.50.

Calcium Hydroxide

For use only on vital pulps.
1 oz. $1.00
Suggested Directions with each package.

AMMONIACAL SILVER NITRATE

Produces a metallic silver coating when reduced with Eugenol or Formaldehyde. Each item supplied in a 2 dram dropper bottle. Suggested uses: applications to carious areas, hypersensitive dentin and root canal treatment. Single packages or combination.

Ammoniacal Silver Nitrate Sol. $2.00
Reducing Agent, each ..... .50

Accepted Council on Dental Therapeutics American Dental Association

CETYLCIDE

Germicidal Concentrate for Instrument Disinfection

CETYLCIDE, the synergistic formulation of two quaternary ammonium compounds, is the outstanding disinfectant of bacteriological research* for the cold disinfection of metal, glass, rubber and plastic instruments and appliances. CETYLCIDE contains no mercury, phenol or formaldehyde. CETYLCIDE is Rapid-Acting, Non-Injurious, Odorless, Rust-Proof, Non-irritating*, Colorless and Highly Stable. CETYLCIDE is supplied in convenient, economical, space-saving ampules (box of 8 ampules (7.5cl) supplies 8 quarts of solution). Available through your dealer.

FAST! POWERFUL! SAFE!

*Clinical reports available

FREE SAMPLES ON REQUEST

Cetylite INDUSTRIES, INC.

29-46 Northern Blvd., Long Island City 1, N. Y.

READY FOR USE

Pulpdent ROWER PAT. PENDING

the ORIGINAL PRE-MIXED calcium hydroxide-methyl cellulose paste*

for PULP CAPPING PULPOTOMY CAVITY LINING

Order from your Dental Supply House

*Bibliography on request

ROWER DENTAL MFG. CORP.

Boston 16, Mass. U. S. A.

America's Largest Printers to the Professions

HISTACOUNT®

STATIONERY

PATIENTS' RECORDS

BOOKKEEPING SYSTEMS

FILES AND FILING SUPPLIES

For 25 years, the name HISTACOUNT has symbolized America's largest printer catering exclusively to the Medical profession. HISTACOUNT stands for highest quality at low prices, with an unconditional money-back guarantee on every item.

CHECK SAMPLES YOU WANT AND ATTACH COUPON TO YOUR LETTERHEAD

☐ LETTERHEADS ENVELOPES	☐ COURTESY CARDS	☐ WINDOW ENVELOPES
☐ PROFESSIONAL CARDS	☐ CONTRACT CARDS	☐ COLLECTION HELPS
☐ BILLHEADS STATEMENTS	☐ REMINDER CARDS	☐ INSTRUCTION SLIPS
☐ PRESCRIPTION BLANKS	☐ RECEIPT CARDS	☐ PATIENTS' RECORDS
☐ ANNOUNCEMENTS	☐ GUMMED LABELS	☐ BOOKKEEPING SYSTEMS
☐ APPOINTMENT CARDS	☐ DRUG ENVELOPES	☐ FILES AND SUPPLIES

MY SPECIALTY IS _____ S-3-3

PROFESSIONAL PRINTING COMPANY, INC.

202-208 TILLARY STREET BROOKLYN 1, N. Y.

MAIL COUPON TODAY!

- *The long awaited development of rapid, precision sterilization for the professional office.*
- *Factory guaranteed. Sold only by authorized dealers.*
- *For further information write to Department DC-3.*

AMERICAN STERILIZER COMPANY
Erie, Pennsylvania

DESIGNERS AND MANUFACTURERS OF SURGICAL STERILIZERS, TABLES AND LIGHTS

When supernatural divining located oil

HISTORY records 1859 as the beginning of the commercial oil industry in the United States. Prospectors, for lack of more scientific methods, resorted to supernatural divining to locate oil deposits.

In this era very little oil was needed and divining with peach twigs or "oil witch" was one of the popular methods. As demand increased, prospectors re sorted to other methods. They drilled in areas that resembled oil-producing areas, along river beds or for no other reason than a strong hunch that oil was present.

Accepted COUNCIL on DENTAL THERAPEUTICS AMERICAN DENTAL ASSOCIATION

It was thirteen years prior to this romantic oil era that our founders, Dr. Austin Church and John Dwight, introduced baking soda to the Western hemisphere.

Dentists have found no other dentifrice so useful in so many ways as Arm & Hammer, or Cow Brand U.S.P. pure Bicarbonate of Soda. Soda's gentle action cleans teeth safely . . . helps restore teeth to their natural brightness without harm to enamel. Bicarbonate of soda is an efficient dentifrice for L. acidophilus reduction—an important factor in caries control.

Free children's storybooks. We would like to send you children's storybooks for your waiting room. They are approved by leading educators and the Council on Dental Health. Just write to us at the address below.

CHURCH & DWIGHT CO., INC.

10 Cedar Street • New York 5, N. Y.

BUSINESS ESTABLISHED IN 1846

THAT'S WHEN HE REALLY BECAME SOLD ON JECTRON

REG. U.S. PAT. OFF.

The Best Fitting Denture Ever Made

A Michigan dentist (name on request) reported that shortly after inserting four new JECTRON dentures he realized he hadn't heard from any of the patients. He was puzzled, and even a bit worried, until inquiry revealed that none of the patients had felt any need to return for the fitting and trimming which had always been a part of his denture routine. The dentures had fitted snugly and caused no irritation.

Because JECTRON's dimensional and occlusal accuracy so faithfully reflect impression detail and bite registration, the retention and occlusion are well beyond past experience. That's why the average patient does not have to return for after-trimming, and why JECTRON deserves to be called *the best-fitting denture ever made.*

Decide now to try a few JECTRON cases; you'll become "sold" on them too.

THE TOLEDO DENTAL PRODUCTS COMPANY
Toledo 1, Ohio

Please send JECTRON booklet and name of nearest JECTRON processing laboratory.

Dr. .....

Street Address .....

City ..... Zone ..... State .....

J33

WHY A *Castle* NEVER LEAVES A RUST STAIN

Model No. 91

When you scratch the base of a Castle sterilizer you find pure cast aluminum. The beauty of this is that aluminum *can't* rust, *can't* ever stain your floor.

Only Castle uses the aluminum base. In fact, only Castle has *all* the thoughtful extras that insure top convenience for you for years to come. The best way for you to check this is to ask your sterilizer repairman. Say, "Which make of sterilizer gives you the *least* trouble?" Ten to one he'll say Castle. We know because we keep track of such things.

For complete information on sterilizers ask your Castle salesman, or write Wilmot Castle Co., 1104 University Ave., Rochester 7, New York.

NEW!

THE No. 91 HAS CAST-IN-BRONZE COVER

Here is a brand new sterilizer with a brand new cover design. The lid of the boiler is one solid piece of cast bronze—with break-proof hinges and lug... beautiful in gleaming chrome.

For a good laugh and a new look at sterilization—read our booklet, "The Untimely Ending of Jose Bacillus." Write for it, or ask your Castle dealer.

Castle **LIGHTS and STERILIZERS**

No cigarette can contain a filter

this GOOD
this LONG
this THIRSTY

for nicotine and tars!

Neither you, nor your patients, have to change cigarette brands to enjoy the protection of filtered smoking. You can filter *any* cigarette with a Denicotea Holder.

Each Denicotea filter contains silica gel, one of the most efficient filtering materials known. This filter traps and absorbs nicotine and tars that would otherwise reach your nose, throat and lungs.

PROFESSIONAL ½ PRICE INTRODUCTORY OFFER:
Send for your Denicotea Holder, $1.25 postpaid (regularly $2.50). Longer Denicotea Holder, $1.75 postpaid (regularly $3.50). Write to Alfred Dunhill, Dept. D-3 660 Fifth Ave., N.Y. 19.

SEE FOR YOURSELF

Before use: Denicotea crystal filter is pure white

After use: Denicotea filter turns black as it absorbs tars and nicotine

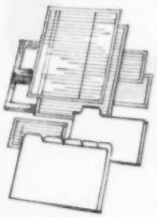
dunhill

DE·NICOTEA

FILTER HOLDER

Companions to a Successful Practice...

COLWELL RECORD SUPPLIES for DENTISTS



Developed by the originators of the DAILY LOG . . . specialists in professional record supplies since 1927.

Your choice of a wide variety of economically priced and attractively designed Dental Charts and Ledger Cards.

Also File Envelopes, File Indexing, Professional Stationery, Appointment, Professional and Announcement Cards, Record of Payments, Appointment Log and many other record supplies you need for a better organized practice.

Send for FREE Catalog

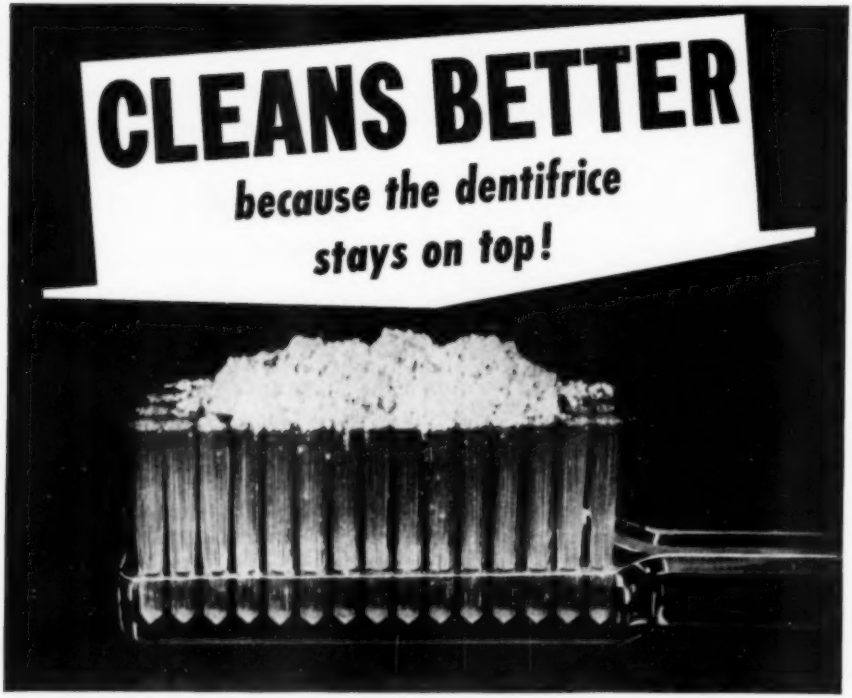
COLWELL PUBLISHING CO.
262 University Ave.
Champaign, Ill.

Please send me the COLWELL CATALOG of Dentists' Record Supplies.

Name .....

Address .....

.....

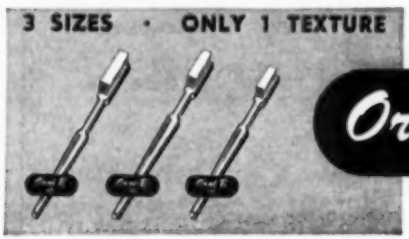


More Bristles Make the Difference!

Try placing some powder on an Oral B toothbrush. Then notice how the dentifrice stays on top — where it belongs. This is because 2500 softer, smaller, straight-cut bristles are mounted so compactly.

If a liquid dentifrice is prescribed, the Oral B is equally efficient. Since the bristles hold 4 to 6 times more liquid than an ordinary brush, cleansing action is far more effective.

Development of this *Original* multi-tufted, soft bristle brush is the answer to a need long expressed by professional men. The two major oral hygiene problems are now solved with a *single* brush. Tooth structure is thoroughly cleansed without abrasion and gingival massage is possible without injury. Try this brush which provides *extra safety* for teeth *and* gums. You'll feel the difference immediately.



Write today for complete information

Oral B Company

318 SOUTH FIRST STREET
DEPT. C, SAN JOSE 13, CALIF.

New! Spiro CONTROLLED FLOW TRAYS

for alginate impressions with "copper band" detail and accuracy

7 outstanding advantages of COE SPIRO PARTIAL DENTURE TRAYS

- ★ You automatically get correct depth of tray. Long or short teeth, high or low ridges cease to be a problem.
- ★ You eliminate the hazard of teeth touching bottom of tray.
- ★ You don't have to depend on a steady hand for a perfect impression. Periphery of tray rests solidly in the fornix and prevents distortion.
- ★ You avoid "widened saddles in ill-fitting partials" because the flexible flanges of the impression material are rigidly supported.
- ★ Your patient's lips can't displace the impression material; extended flanges act as a guard.
- ★ You can't trap a bubble in the frenum region; deep vaults are filled; anatomical details sharply defined and free of air bells.
- ★ You eliminate retakes and make-overs. You build greater patient confidence by the certainty and accuracy of your work. You get better results with less time.

Unique in design, the NEW Spiro Tray provides many advantages heretofore impossible with ordinary trays. It mechanically confines the impression material and controls its flow over the desired areas. Actually a double tray, hinged at the heel, with an inner, perforated, bottomless element that telescopes in and out of the outer solid tray. This gives extra depth; controls and confines the flow of impression material; forces out any air that may have become trapped in the material; registers completely and accurately every detail of the desired area.

Coe Spiro Partial Denture Trays are available in sets of six at your dealer's for only $27.00, or singly at $4.50 each.

ORDER FROM YOUR DEALER

Write for descriptive folder and directions.

COE LABORATORIES, INC.
CHICAGO 21, ILL.

. . . tested and established in laboratory use over 30 years!

CloverLeaf

IMPRESSION PLASTER

Green Clover Leaf XX Plaster with Wintergreen flavor

White Clover Leaf XX unflavored

Fine grained for faithful reproduction of every detail of teeth and tissue. Rapid, accurate set; breaks with a clean fracture.

HARDITE MODEL

Holds the case to unchanging dimension regardless of curing temperature. Laboratory-controlled manufacture assures consistent uniformity, positive reproduction for perfect fit and articulation.

ALSO: *Standard Set Plaster; Hard Plaster; Laboratory Plaster; Vulcanizing Stone; Flasking Compound.*

FREE SAMPLES

H. B. WIGGIN'S SONS CO. A-3
Bloomfield, N. J.

Please send free sample of CLOVER LEAF XX Impression Plaster
____Wintergreen ____Unflavored

Dr._____

Address_____

City_____ State_____

My supply house is_____

The Gentle Way to
S-P-R-E-A-D
CROWDED TEETH
BURLEW
READY-CUT
WEDGES
PATENTED

Separate teeth for cavity preparation, filling and for interproximal cleaning.

Complete Outfit $1.15

About 100 Ready-Cut Celluloid Wedges in assorted sizes — 2 Separating Discs — 1 Wedge Setter.

Sold by Better Dealers

J. F. JELENKO & CO., Inc.
136 W. 52nd St., New York, U.S.A.

THE
MEDICAL
PROTECTIVE
COMPANY
FORT WAYNE,
INDIANA

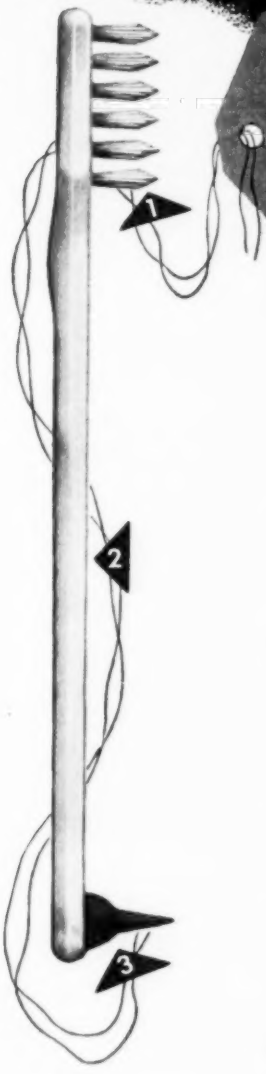
PROFESSIONAL PROTECTION EXCLUSIVELY SINCE 1899

specialized service assures "*know-how*"

only

PY-CO-PAY TOOTHBRUSH

offers all 3!



1. **Natural bristles "Duratized"** for longer life. Bristles reinforced by special process to assure "flexible stiffness," resist matting for longer periods... outlast ordinary brushes up to 3 times.

2. **Straight-line design** to meet professional preference. Straight-trimmed bristle tufts, straight shank, straight handle... for simpler, more efficient manipulation.

3. **Py-co-tip** for interdental hygiene. Flexible, resilient rubber construction... ready for your patient's use according to your instructions, to reach interproximal spaces inaccessible to the toothbrush.

Pycopé, Inc. · **Jersey City 2, New Jersey**

Py-co-pay *The Ultimate in Design, Efficiency, Longevity*

RECOMMENDED BY MORE DENTISTS THAN ANY OTHER TOOTHBRUSH

first

means "original, before all others" . . .

FR X-Ray solutions were first in concentrated liquid form (more than 15 years ago). And through continuing research and improvement have maintained their years-ahead advantages.

first

means "finest, better than all others" . . .

FR Concentrated Liquid X-Ray Solutions have proven their superiority in quality . . . accuracy . . . clarity . . . diagnostic detail in dental and hospital darkrooms all over America.

first

means "safety, dependability" . . .

That's why FR Concentrated Liquid X-Ray Solutions are first in your dental darkroom.

In every way

fR

CONCENTRATED LIQUID X-RAY SOLUTIONS

Were, are, always will be FIRST!

KERR MFG. CO.
Exclusive distributors to the dental field for

FREE: X-ray Developing Guide. Write to Dept. A

THE FR CORPORATION · 951 BROOK AVE. · NEW YORK 56, N.Y.

GENTLEMEN . . BE SEATED

PRACTICAL

COMFORTABLE

ADAPTABLE

SENSIBLE

the Posture Comfort Chair

THE ONLY CHAIR WITH 3 WAY FUNCTIONAL SUPPORT

Be among the many satisfied dentists who operate in the seated position with the most practical, comfortable, adaptable and sensible seat available. Decide now to get the best. Get the Posture Comfort Chair, which not only eliminates the strain on the legs and feet, but affords complete body support . . . forward, backward and sidewise. Order from your dealer, or write:

CHILDS MANUFACTURING COMPANY
MACON, GEORGIA

IT'S ACRALITE
For LONGER-LASTING RESTORATIONS

fastcrown
FILLING PLASTIC

In a recent article, "Acrylic Restorations by the Operative Non-Pressure Procedure", Dr. Frank H. Nealon points out, "... The main objective of this technique is to secure perfect marginal adaptation by compensating for the volumetric loss of this material to infinity. When the acrylic is placed in the cavity it loses an appreciable amount of volume. This loss is compensated for by repeated additions of acrylic under conditions outlined in the technique." FASTCROWN — and *only* FASTCROWN — makes possible the true NEALON non-pressure technique. FASTCROWN is the *only* filling plastic that offers all the advantages you look for in a filling material —

- **FASTCROWN restorations are superior, no matter what technique may be used —**
- **FASTCROWN cures as fast; uses less liquid —**
- **FASTCROWN has less shrinkage —**
- **FASTCROWN is non-irritating to the pulp—**
- **FASTCROWN possesses color stability —**

*Journal of Prosthetic Dentistry, 2:513-527

ACRALINER
DENTURE RELINER

Here is the reliner — *the only rebase material* — that overcomes the 5 major difficulties experienced with all oral relining materials.

1. ACRALINER is really color stable—as color-safe as the denture itself!
2. ACRALINER is especially processed to reduce monomer odor that patients find objectionable!
3. ACRALINER technique eliminates raised bites and distorted occlusion!
4. ACRALINER technique makes possible an accurate postdam, every time!
5. ACRALINER lessens irritation. Less monomer is necessary and it has been treated to increase patient comfort!

Write for complete literature and new detailed technique booklets.

ACRALITE • SUPERIOR PRODUCTS for MODERN DENTISTRY
ACRALITE CO. Inc. 230 W. 41 St. New York 36, N.Y.

THE NEW LOW COST REMINGTON *Office-riter*

The Complete....Compact Typewriter For Professional and Small Business Use

Here it is—a typewriter that's just right for the professional or small business office. And its low price is just right, too! The new Remington Office-riter has every needed, practical typing feature for general correspondence, invoicing, carbon copies and stencil cutting. Accurate columnar typing is easy with the exclusive Miracle Tab that sets and clears tabulator stops from the keyboard with a flick of the finger.

The fast, responsive action and crystal clear printwork that are the hallmarks of a fine office typewriter are yours with the Office-riter. So, if you have been thinking of getting a new typewriter for your office—and if you want to make a *substantial saving*—call your local office equipment dealer and ask to see the Office-riter today!

Standard 11-inch carriage with a full 10 3/10-inch writing line.

—The Office-riter's 11-inch paper capacity is large enough for all general office typing, and the writing line is the longest of any 11-inch carriage machine now manufactured. The Office-riter easily takes paper, carbon packs, cards or forms up to 11 inches wide.

Plus all these other office typewriter features:

Exclusive Miracle Tab
New direct-set visible margin
Standard keyboard with 42 keys, 84 characters
Patented simplified ribbon changer
Super-strength frame construction

THE ONLY COMPLETE COMPACT LOW COST OFFICE TYPEWRITER

A PRODUCT OF Remington Rand

DEPTH WITHOUT DANGER

WITHIN a few seconds the modern skyscraper's elevators descend a thousand feet . . . carrying hundreds of thousands of men and women safely—day after day, year in and year out . . . *Depth without Danger!*

Monocaine 2ME, the Safety First Local Anesthetic, too, carries hundreds of thousands of patients into the blessed realm of deep, profound, safe anesthesia . . . week in and week out . . . free from the tissue trauma and side effects of "strong" local anesthetics . . . *Depth without Danger!*

MONOCAINE 2ME

THE *Safety First* LOCAL ANESTHETIC

Accepted — Council on Dental Therapeutics — American Dental Association

Monocaine 2ME was developed especially for those cases in which anesthesia is difficult to obtain. It is particularly effective for jacket crown construction, pulp extirpation, preparation of bridge abutments, etc. It produces anesthesia as deep and profound as 4% procaine, but its toxicity is considerably less. Its action is gentle; free from untoward reactions. Tissues return to normal quickly. Use 2ME—the local anesthetic solution that's always safe as well as potent!

NOVOCOL CHEMICAL MFG. CO., Inc.
2911-23 ATLANTIC AVE., BROOKLYN 7, N. Y.

LEA & FEBIGER BOOKS

Coolidge and Hine—Periodontia

Clinical Pathology and Treatment of the Periodontal Tissues

By EDGAR D. COOLIDGE, D.D.S.
Professor Emeritus of Therapeutics, Preventive Dentistry and Oral Hygiene, Chicago College of Dental Surgery, School of Dentistry, Loyola University, Chicago

and MAYNARD K. HINE, D.D.S.
Professor of Periodontia and Histopathology and Dean, Indiana University School of Dentistry, Indianapolis

This book will be most helpful in the study of the symptoms, diagnosis and treatment of periodontal diseases. Full discussions are devoted to gradual changes in soft tissue, pathologic conditions, trauma and home care.

318 Pages. 378 Illustrations on 219 Figures and 2 Plates in Color. $6.00

McBride—Juvenile Dentistry

By WALTER C. McBRIDE D.D.S., F.A.C.D.
Formerly Associate Professor of Operative Dentistry and Director of the Department of Pedodontics, School of Dentistry, University of Detroit; AND CONTRIBUTORS

5th Edition. Dr. McBride shows how dentists can apply the technics of juvenile dentistry and thus form the foundation of a profitable practice. In this revised and fully up to date *5th edition*, emphasis is on management of children; on the elimination of devitalized and abscessed teeth and lost fillings; and preventive dentistry. Many new and important features have been added.

5th Edition. 370 Pages
302 Illustrations. $7.00

Washington Square **LEA & FEBIGER** Philadelphia 6, Pa.

PRICE PER SET 75c

KEEP YOUR

JOURNALS EFFICIENTLY

AND INEXPENSIVELY

BY USING

A.D.A. Journal Filing Cases

These cardboard cases, which are made especially to fit your ADA JOURNALS, are now available in an attractive dark blue, and are designed to conform with the JOURNAL's new format.

They are sold in sets of two, each of which will hold a complete volume (six issues). Numerals for the years 1950-1959 are included with each set. These are white on a blue ground, and are on gummed paper.

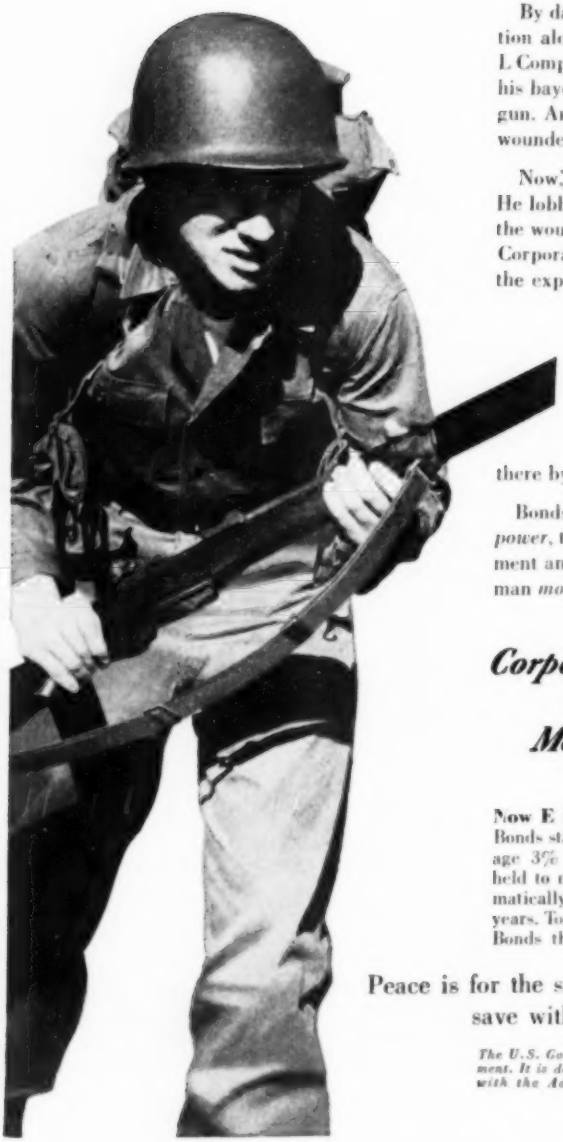
AMERICAN DENTAL ASSOCIATION • 222 EAST SUPERIOR STREET • CHICAGO 11, ILLINOIS

Enclosed is _____ for _____ sets A.D.A. J.J. filing cases at 75c per set.

Name_____

Address_____

He Went Out to Meet Them



WITH FLARES AND WHISTLES and blaring bugles, the Reds had been attacking fanatically all night. Wave after wave they came, in overwhelming numbers.

By dawn, Jerry Crump could see that his position alone was keeping them from overrunning L Company. Twice he went out to meet them with his bayonet. Once he retook a captured machine gun. And four times he left shelter to bring in wounded comrades.

Now, an enemy soldier crept close unobserved. He lobbed a grenade. It landed squarely among the wounded men. Without a second's hesitation, Corporal Crump threw himself upon it, smothered the explosion wtih his own body, and saved his four companions' lives.

"I got hurt," says Jerry Crump, "but I got back alive. Because our armed forces have the finest medical equipment in the world—even at the front. And *you* helped put it there by investing in U. S. Defense Bonds."

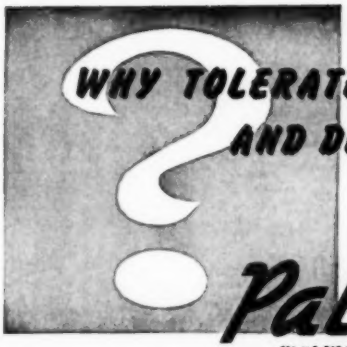
Bonds are savings. But they mean *production power*, too. Helping provide the arms and equipment and care of every kind that give a fighting man *more* than a fighting chance!

Corporal Jerry Crump
U.S. Army
Medal of Honor

Now E Bonds pay 3%! Now, improved Series E Bonds start paying interest after 6 months. And average 3% interest, compounded semiannually when held to maturity! Also, all *maturing* E Bonds automatically *go on* earning—at the new rate—for 10 *more* years. Today, start investing in U. S. Series E Defense Bonds through the Payroll Savings Plan at work.

Peace is for the strong! For peace and prosperity save with U.S. Defense Bonds!

The U.S. Government does not pay for this advertisement. It is donated by this publication in cooperation with the Advertising Council and the Magazine Publishers of America.



WHY TOLERATE INTERNAL STRAINS AND DENTURE DISTORTIONS

. . . When you can be SURE with

Palatex-51

REG. U.S. PAT. OFF. AND IN FOREIGN COUNTRIES

COLD CURE DENTURE ACRYLIC

Boiling and cooling acrylics create internal strains that result in some denture distortion and weakening, no matter how stable the base.

All *approved* cold-cure denture materials produce stronger, more accurate dentures — for they eliminate the one big disadvantage of boiling. But PALATEX '51 provides a *plus* — finer particle size. This 200 mesh powder (so fine it escapes the naked eye) imparts even greater strength . . . better flow . . . and a tissue-like look that defies detection.

Dentists and Laboratories alike have been quick to recognize the great advantage of the cold cure denture materials. Why not avail yourself of the very best on your next case — use PALATEX '51.

Available in regular pink and dark pink
At Your Dealer

FREE!

One 8-ounce bottle of New—Improved *Acryfoil* the superior acrylic tinfoil substitute (sells for $1.50) with each package of Palatex '51.

Attach this coupon to your order and mail to J. Bird Moyer Co., giving name of your dealer.

Manufactured by ROCKLAND DENTAL CO., INC.

Sole Distributor

THE J. BIRD Moyer CO., INC.

117-21 N. FIFTH STREET PHILADELPHIA 6, PA.

"...and be sure to take your VITAMINS!"

During the formative stage of tooth development, vitamins play an essential role in mineral and bone deposition.

A balanced vitamin preparation is assurance that the patient will receive her needed daily vitamin intake.

MERCK & CO., INC., RAHWAY, N. J.—as a pioneer manufacturer of Vitamins—serves the Dental Profession through the Pharmaceutical Industry.

© Merck & Co., Inc.

An efficient source of nutrients

ICE CREAM has five characteristics which star it as a food of high nutritional value: nutrient contribution . . . acceptability . . . completeness of digestion . . . efficiency of nutrient utilization . . . and adaptability to many types of diets.

Ice cream supplies energy, protein, calcium, riboflavin, vitamin A, and all other nutrients occurring in milk.[1]

Ice cream is popular with all—an important nutritional fact. Regardless of its nutrients, a food has no value unless it is eaten, and the nutrients used by the body.

Laboratory studies show ice cream is completely digested . . . its nutrients are readily available to the body.[2, 3]

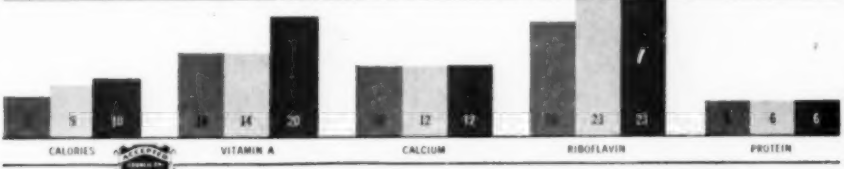
The nutrients of ice cream are well utilized . . . milk protein, because of its desirable ratio of amino acids; the natural vitamin A, because it is preformed; the riboflavin, because it has been shown to be 100 per cent available to the body. No source of calcium is better utilized than that in milk.

Ice cream is valuable for everyday use by healthy people—and for therapeutic and convalescent djets, where energy value and body-building nutrients are needed in an easy-to-eat, readily digested form.

Ice cream is a good food, good for all.

[1]Dahlberg, A. C. and Loosli, J. K. Nutritive value of commercial ice cream. J. Am. Diet. Assn. *24*:20 (Jan.) 1948.
[2]Everson, G., Pearson, E., and Matteson, R. Biological availability of certain foods as sources of riboflavin. J. Nutr. *46*:45 (Jan.) 1952.
[3]Everson, G., Wheeler, E., Walker, H., and Caulfield, W. J. Availability of riboflavin of ice cream, peas, and almonds, judged by urinary excretion of the vitamin by women subjects. J. Nutr. *35*:209 (Feb.) 1948.

Percent contribution of one serving (1/6 qt.) vanilla ice cream to daily needs for some nutrients.



This seal indicates that all nutrition statements in the advertisement have been found acceptable by the Council on Foods and Nutrition of the American Medical Association.

NATIONAL DAIRY COUNCIL

111 NORTH CANAL STREET • CHICAGO 6, ILLINOIS

Since 1915 . . . the National Dairy Council, a non-profit organization, has been devoted to nutrition research and education to extend the use of dairy products.

Just right for your young patients . . .

PRO "59"

Child's Size

The right size — flat-trimmed, one inch head. The right texture — soft-yet-firm, multiple bristle. And the right quality — made by Pro-phy-lac-tic!

The PRO "59" Child's Size provides safe, deeper cleaning! The finer bristles reach even tiny cracks. They afford more efficient polishing action, too.

These softer, finer, gentler bristles won't hurt tender gums. Bristles are firmly anchored, won't come out in the mouth. Your young patients can safely use this fine quality brush.

For correct size, for deeper cleaning, for safe texture—it's the PRO "59" Child's Size. We hope you'll recommend it to your patients.

PRO-PHY-LAC-TIC BRUSH COMPANY
Division of The Lambert Company, *Florence, Mass.*

ASSOCIATION PLAN

Accident and Health Insurance

THIS IS THE ONLY PLAN OF ACCIDENT AND HEALTH INSURANCE ENDORSED OR APPROVED BY THE AMERICAN DENTAL ASSOCIATION

★★★★

BRIEF OUTLINE OF COVERAGE

Accident Benefits —Full monthly benefit for total disability, from FIRST DAY, limit 60 months. **One-half monthly benefit for partial disability, limit 6 months.** Limit of time for total and partial combined 60 months.

Sickness Benefits —Full monthly benefit for total disability commencing with Eighth day of disability, limit 24 months, **house confinement not required.**

Individual Termination —The insurance of each insured member will continue in force concurrently with the group policy and may only be terminated by reason of any of the following conditions:

a. If the group policy is terminated.

b. If the insured member fails to pay the required premium.

c. If the insured member ceases to be a member of the American Dental Association

d. If the insured member retires or ceases to be actively engaged in the dental profession.

★★★★

PREMIUM RATES

(Applicable to ages at entry and attained at annual renewal of insurance)

			SEMI-ANNUAL RATES		
Monthly Benefits	**Accidental Death Benefit**	**Dismemberment Benefits**	**Ages Up To 50**	**Ages 50 to 60**	**Ages** 60 to 65**
$100.00	**$3,000.00**	**$ 5,000.00**	**$16.05**	**$18.30**	**$22.80**
$200.00	**3,000.00**	**10,000.00**	**30.15**	**34.65**	**43.65**
$300.00	**3,000.00**	**15,000.00**	**44.25**	**51.00**	**64.50**
$400.00	**3,000.00**	**20,000.00**	**58.35**	**67.35**	**85.35**

Premiums will be billed half-yearly.

**Although the age limit for acceptance of risks is the 65th birthday, once issued, there is no termination age limit for renewal.

If you are not now insured under the ASSOCIATION PLAN, communicate with the Trustee of the Policy Dr. Paul W. Zillmann, 29 Walden Avenue, Buffalo 11, N. Y., or with M. A. Gesner Inc. 150 East Superior St., Chicago 11, Ill.

★★★★

Issued Exclusively by

NATIONAL CASUALTY COMPANY of Detroit

Through

M. A. GESNER INC.

150 East Superior Street **WHitehall 3-1525** **Chicago 11, Ill.**

Since the National Casualty Company's plan of accident and health insurance is now in effect in New York, New Jersey, California, Utah and Nevada, the Association Plan is not available in those states.

CLASSIFIED ADVERTISING

Forms close on 25th of second month preceding month of issue

Remittance Must Accompany Classified Ads.

Advertisements cost $3.50 not exceeding 30 words, additional words 10c each. Commercial agency advertisements, $3.50 for 20 words, additional words 13c each. Publisher reserves the right to determine classification. An extra fee of 25c is charged advertisers who have answers sent care of A.D.A. and in such cases we do not furnish name or address to inquirers. This rate applies for each insertion.

PRACTICES AND OFFICES FOR SALE

CALIFORNIA—Established lucrative general practice in Dinuba, California. Located in new medical building. Modern, two-chair, well equipped. Reason: specializing. Write Dr. Van M. Graves, 96 West 47th St., Long Beach, California.

•

CALIFORNIA—Periodontist. Excellent opportunity with established practice. Immediate income without any investment. Must have California license. Address A.D.A. Box No. 158.

•

COLORADO—For Sale. Established practice in Colorado town of 15,000. Pleasant town in which to live; fine people; wonderful year-round climate; good fishing and hunting. What's more, you can make money immediately. Address A.D.A. Box No. 208.

•

FLORIDA—Dental practice grossing $30,000 yearly in best downtown Miami location. Two new Ritter equipped operating rooms complete with x-ray. Office beautifully furnished. Air-conditioned. Complete $13,500. Owner must move to another area. Direct replies to 628-9 DuPont Bldg., Miami, Fla. Phone 82-4434.

•

FLORIDA—For Sale. In downtown Miami, overlooking Biscayne Bay. Twenty-seven year practice, available immediately. Two operating rooms, one fully Ritter equipped —new Ritter x-ray. Other fitted as lounge —laboratory—darkroom—office and reception room—newly decorated. Death reason for selling—low rental—lease. Address A.D.A. Box No. 209.

•

MASSACHUSETTS—For Sale. Busy, established two-chair practice on Cape Cod. Ritter units, x-ray, motor chair, business office with x-ray projector, dental laboratory, air compressor. Wonderful class of people. Excellent opportunity for young dentist. Address A.D.A. Box No. 210.

•

MICHIGAN—Kalamazoo. Small, completely equipped one-chair dental office. For immediate sale because of death. Best location, excellent opportunity. Direct replies to Mrs. R. F. Snyder, Jr., 1228 Miles Avenue, Kalamazoo, Mich.

•

NEW YORK—Long Island. Ideal location. Six room house with separate Ritter equipped dental wing. Recent practice, growing fast. Excellent potential. Everything new. Illness forces sale. Address A.D.A. Box No. 211.

OHIO—Well-established neighborhood practice with excellent clientele in Dayton's finest suburb. Ultra-modern two-chair office beautifully equipped and furnished. Will introduce purchaser to patients. Gross $30,000. Address A.D.A. Box No. 175.

•

OHIO—Orthodontic practice in Ohio available. Edgewise appliance; Tweed Philosophy. Excellent opportunities. Will remain to introduce patients. Address A.D.A. Box No. 212.

•

PENNSYLVANIA—For Sale. Thirteen room house with modern two-chair dental office and laboratory, Philadelphia. Direct replies to Dr. L. M. Ennis, 4001 Spruce St., Philadelphia 4, Pa.

•

WASHINGTON—Successful, long established ethical practice, Puget Sound country. Ritter equipped two-chair office. Owner desires to retire. Will stay reasonable time to introduce successor. Address A.D.A. Box No. 213.

OPPORTUNITIES AVAILABLE

CONNECTICUT — Permanent associate wanted for lucrative general practice. Profit-sharing basis with partnership possibilities. Five-chair modern bungalow office. Excellent opportunity. Give full details as to professional background and military status. Address A.D.A. Box No. 191.

•

ILLINOIS—Technician, 35 years or under, wanted by two dentists in modern clinic with three physicians. Town of 6,000. Experienced all phases Gold Technique. Ambitious, personable, cooperative. Give full details first reply. State salary. Direct replies to Dr. Clyde L. Stroup, Doctors Clinic, Fairfield, Ill.

•

IOWA—Wanted: Dentist with Iowa license to take my practice while I am in the service for about 18 months. Good opportunity for young man just starting and unable to start on own. Direct replies to Dr. Robert M. Garvey, Griswold, Ia.

•

MARYLAND—Wanted: Resident in Oral Surgery and Dental Intern beginning July 1, 1953. Applicants for residency must have postgraduate or previous hospital training. Recent graduate accepted for internship. Applicants must be graduates of accredited dental schools. Training in all surgical and related subjects. Approved by A.D.A. Direct replies to Executive Director, Sinai Hospital, Baltimore 5, Md.

MICHIGAN—Dentist; draft exempt and under 40 years of age, for public health work in Michigan. Starting salary rate $4,500 per year. Michigan license not required provided the individual is a graduate of an accredited United States dental school and is licensed in another state. Direct inquiries to Child Health Division, Children's Fund of Michigan, 660 Frederick St., Detroit 2.

●

MICHIGAN—Dental hygienist; Michigan licensed, for public health work in Michigan. Starting salary rate $3,600 per year. Direct inquiries to Child Health Division, Children's Fund of Michigan, 660 Frederick St., Detroit 2.

●

NEW YORK—Would like associate with idea of purchasing practice in 1 or 2 years. Located in large industrial city in central New York. Address replies to P.O. Box 540, Syracuse, N. Y.

●

NEW YORK—Associate for General practice in Upstate New York. Opportunity to take over practice or partnership. Plan to specialize. Give complete details as to qualifications and remuneration in first letter. Address A.D.A. Box No. 214.

●

OHIO—Wanted: Dentist to associate with group of physicians in a small Ohio city. Address A.D.A. Box No. 215.

●

PENNSYLVANIA—Associate wanted for well-established general practice in suburban Philadelphia. Must be free from military service and have Pennsylvania license. Give full details as to professional experience and state remuneration expected. Address A.D.A. Box No. 216.

●

VIRGINIA—Wanted: Help in general practice. Will furnish equipment, supplies and all necessary expenses. Location in town of 15,000 people. Percentage basis. Address A.D.A. Box No. 217.

●

VIRGINIA—Wanted: Dentists under 40 for State Dental Program. Correctional program for rural elementary school children. Temporary license can be arranged until next meeting of Examining Board. Salary $5,600-$6,608. Modern portable dental equipment or dental trailer furnished. Automobile is necessary. Write State Department of Health, Richmond 19, Va.

●

WEST VIRGINIA—Draft-exempt dentist wanted to take over completely equipped, two-chair, modern office with x-ray; located in southern West Virginia mining camp. Present practitioner to enter military service for two years. Address A.D.A. Box No. 195.

LOCATIONS AVAILABLE

CALIFORNIA—Dental office available, carpet, linoleum, plumbing and electricity. Four physicians in Medical Building, 58 rooms, 28-car parking lot located between city and hospital. Direct replies to Mr. C. V. Bonham, 898 N. Garey, Pomona, Calif.

●

COLORADO—Office and living quarters in same building formerly occupied by physician. Center business district, town three thousand people. No dentist closer than Colorado Springs. Direct replies to Monroe Campbell, Manitou Springs, Colo.

●

ILLINOIS—Dentist office space including reception room, x-ray room and laboratory facilities in modern, air conditioned, ground floor, 15-room center in Logan Square. 25-year practice. $50 to $60 per month. Direct replies to 3505 W. Fullerton Ave., Chicago 47. Albany 2-0808.

ILLINOIS—Office space for rent in modern offices of established M.D. Excellent opportunity for young energetic dentist in this new growing community. Direct replies to Dr. S. L. Ruggero, Wonder Lake, Ill.

●

NEW YORK—Hempstead, L. I. Excellent established dental location in heart of village. Modern two-chair suite, completely air-conditioned. Long lease. Direct replies to Dr. J. E. Bloom, 50 Main St., Hempstead, L. I., N. Y. Phone Hempstead 2-2870.

●

NEW YORK—To sublet. Attractive three-room suite, operating room, laboratory; North Avenue Professional Building. Direct replies to Dr. A. D. Cederbaum, 524 North Avenue, New Rochelle, N. Y. Ne. 6-4118.

●

PENNSYLVANIA—For rent. Four room modern dental suite in medical building. Established office. Active industrial-agricultural community. Trading area exceeds fifty thousand. Ideal living conditions. Direct replies to L. B. Lefever, Realtor-Insuror, 76 E. Ridge St., Carlisle, Penna.

●

VIRGINIA—Office space. Young town, farm trade, factory payroll, new building, entrance at theatre lobby. No competition. Address A.D.A. Box No. 196.

OPPORTUNITIES WANTED

Dentist, age 30, veteran World War II; M.S. Degree in Oral Surgery; 16 months' hospital residency in oral surgery with 4 months' general anesthesia training. Interested in association or purchasing practice in oral surgery. Will take State Board. Address A.D.A. Box No. 188.

●

To purchase. Active dental practice long established and grossing over $15,000—from dentist contemplating retirement. Price is secondary—Connecticut, Westchester or Long Island. Address A.D.A. Box No. 182.

●

Oral Surgeon—July, desires to affiliate with group or association. Three years' general practice. Four years' university and hospital training. Competent to administer intravenous anesthesia. Military completed. Massachusetts license. Take any State Board. Address A.D.A. Box No. 199.

●

Orthodontist, 29, Columbia University orthodontics graduate, private practice experience, two internships, 29 months' service as dental officer. New Jersey, New York, Ohio licensure. Interested in location, association, or purchasing orthodontic practice. Address A.D.A. Box No. 218.

●

Dental research worker desires employment part or full time in Research, Therapeutic Development, or Medical Service Division of ethical pharmaceutical company. B.A. 1945, D.D.S. 1946. Forty-three papers on pharmacology or experimental clinical therapeutics published or in press in medical or dental journals 1950-1952. Will continue present association with Research Division of fine Eastern dental school and as Associate Editor of leading State dental journal; Sigma Xi, 1952; one year's advertising agency experience. Address A.D.A. Box No. 219.

●

Dentist in north Jersey town crowded with dentists wants to meet over-worked dentist, preferably in resort area of N. J. or N. Y. with view to working in his office one or two days weekly; more in summer. Best references. Address A.D.A. Box No. 220.

Recent graduate, with two years of formal training in oral surgery, desires an opportunity to associate with or take over a practice in oral surgery. South or Southwest preferred. Address A.D.A. Box No. 221.

●

Dentist with Maryland license to be released from service in June desires Maryland or Rhode Island location or practice. Age 28. Address A.D.A. Box No. 197.

●

Licensed dentist completing 24 months service in May, desires location in progressive town of approximately 5,000 population in Oregon's Willamette Valley. Direct replies to Dr. G. B. Arrington, Box 512, Waynesville, Missouri.

●

Dentist, 1949 graduate, would like to associate with or purchase general practice or obtain suitable location for individual practice in the Rio Grande Valley of Texas. Completing 4 years military service. Address A.D.A. Box No. 222.

●

Dentist, 1941 graduate, veteran, wants association with either an institution, industrial organization, group practice, private practice. Full or part-time. Within commuting distance New York City, Connecticut or New York. Address A.D.A. Box No. 223.

Recent graduate, draft exempt, with one year experience in general practice desires association in general practice with ethical dentist in California. Address A.D.A. Box No. 224.

MISCELLANEOUS

NEW ITEMS DEVELOPED—Send us your ideas (drawings, patents, models, etc.). We will investigate manufacturing possibilities, sales potential, conduct market survey, etc. Have connection with a well-known, reputable manufacturer. All ideas kept in strict confidence. Address Box No. 131.

●

WANTED TO BUY—Old or used dental books or journals. Leo L. Bruder, 1 De Kalb Ave., Dept. 21, Brooklyn, N. Y. Dealer in out-of-print dental literature.

●

FOR SALE—Ritter Dental Chair. Good condition. Brand new head rest assembly. Photograph available for inspection. $125 F.O.B., Sioux City, Ia. Direct replies to Woodbury Optical Co., 309 Commerce Bldg., Sioux City 1, Ia.

SOLID BRONZE NAME SIGNS

Cast, raised letters, drilled, with screws

3" x 12" — $10.80	3" x 14" — $12.60	3" x 16" — $14.40
4" x 14" — $16.80	4" x 16" — $19.20	4" x 18" — $21.60
5" x 16" — $24.00	5" x 18" — $27.00	5" x 20" — $30.00
6" x 18" — $32.40	6" x 20" — $36.00	6" x 25" — $45.00

Other sizes 30c per square inch. Signs with wording on both sides 45c per square inch.
COLLECT PLEASE SEND CHECK WITH ORDER
LAUER METAL SHOP · 1516 E. Baltimore Street · Baltimore 31, Md.

are you MOVING ?

Giving us advance notice will keep the Journal coming to you without interruption. *Here's a handy form to use:*

Name _____

Old Address _____

New Address _____

Mail to American Dental Association, 222 E. Superior St., Chicago 11, Ill.

'SEVRITON'

the new plastic filling material that really Stays Put

Developed by de Trey's world-famous research laboratories, 'Sevriton' at last overcomes the known frailties associated with plastic resin filling materials. The Cavity Seal provides a bond between 'Sevriton' and tooth tissue so perfect that a cavity once filled is there to stay! Three years of tests in actual practices in Europe have established this fact.

The shading and blending of 'Sevriton' make restorations difficult to detect. Further, 'Sevriton' plastic filling material will not discolor in the mouth!

De Trey's 'Sevriton' is truly what you've always looked for in a plastic filling material — order a supply today!

Write for free illustrated booklet today.

'SEVRITON' — an 'AMALGAMATED DENTAL' product developed by DE TREY Frères, S. A., Zurich, Switzerland — is made in England and is a registered trademark.

Claudius Ash, Sons & Co., U.S.A., Inc.

Distributors to the Dental Trade in the U.S.A.

127-131 Coit Street — Irvington 11, N.J.

ONE OF THE AMALGAMATED DENTAL GROUP OF COMPANIES

Gamophen

ANTISEPTIC SOAP

Regular use of GAMOPHEN Antiseptic Soap makes and keeps your hands surgically clean. Wash your hands today, and they'll be cleaner tomorrow, too.

GAMOPHEN does everything other soaps can do—and, because it contains 3% Hexachlorophene, gives you these outstanding advantages:

- 36% more effective* than 3½% tincture of iodine
- Cumulative antibacterial action from routine use
- Non-irritating, non-sensitizing, non-toxic

SUPPLY: Individually wrapped four and one-half ounce cakes in boxes of twelve. Ask your dealer about the attractive quantity rates.

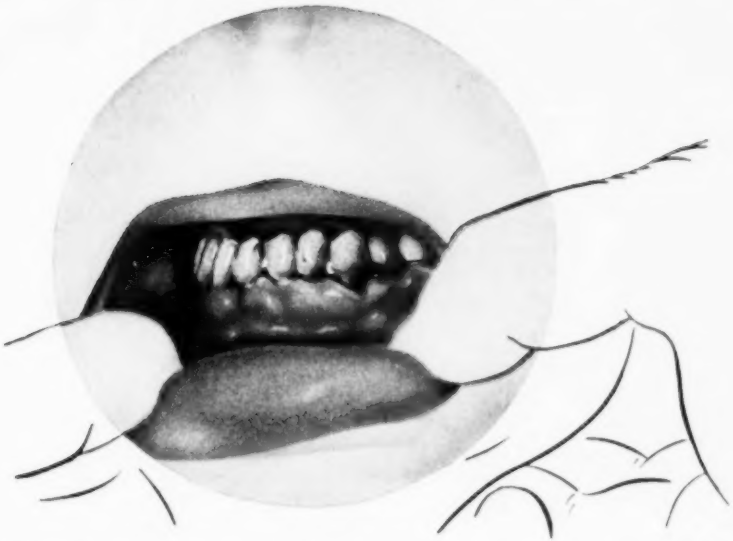
For your copy of the brochure presenting clinical and laboratory evaluation of GAMOPHEN, please write to JOHNSON & JOHNSON Dental Division, New Brunswick, New Jersey.

Recbgnized by patients *Relied on by dentists*

DENTAL DIVISION

Johnson & Johnson

*Tested against mixed cultures of Staph. aureus, Strep. hemolyticus and E. coli



to saturate affected oral tissues with penicillin

ORYGENE®

Penicillin Chewing Troches
Parke-Davis

ORYGENE Penicillin Chewing Troches bathe affected oropharyngeal tissues in steadily maintained concentrations of penicillin. This "saturation" of affected tissues is assured by the gradual release of penicillin from ORYGENE's chicle gum base, and by salivary dispersion in the process of mastication.

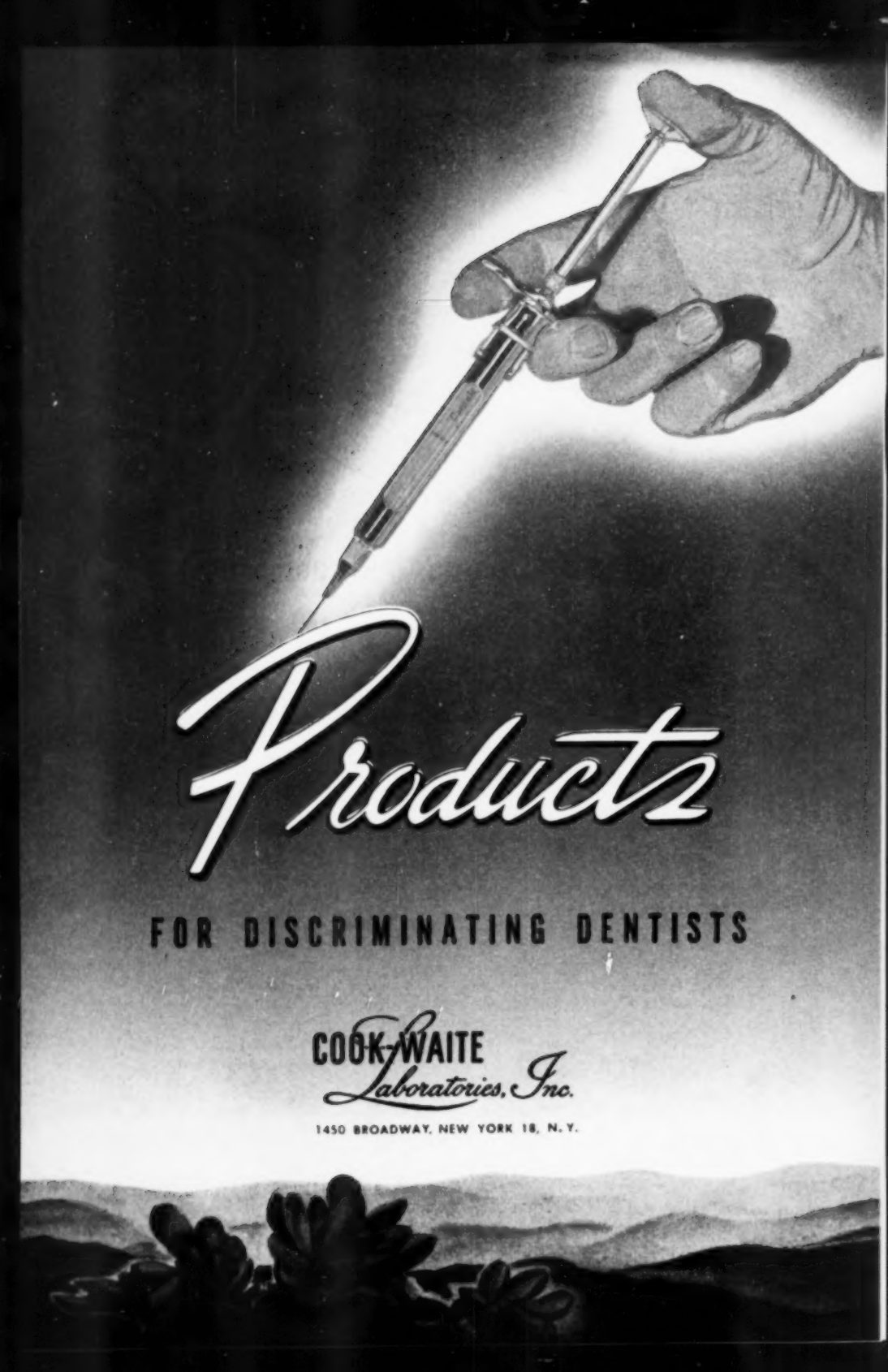
ORYGENE Penicillin Chewing Troches have a fresh peppermint flavor which encourages retention in the mouth — further assurance of adequate exposure time at the site of the infection.

Dosage and Method of Use. One ORYGENE trochе should be chewed at a time, preferably for 30 minutes. In treating infections caused by Vincent's organisms, a daily total of 4 to 6 troches will usually produce clinical results within 24 to 48 hours, although precautionary treatment should be continued for several days thereafter. It may be necessary to supplement ORYGENE by parenteral administration of penicillin, or by other measures as indicated.

Packaging. Each ORYGENE trochе containing penicillin G, crystalline potassium salt, 20,000 units, is individually wrapped, sealed in metal foil — no refrigeration necessary. Available on prescription in packages of 12.

MEDICAMENTA VERA

Parke, Davis & Company
DETROIT, MICHIGAN


Products
FOR DISCRIMINATING DENTISTS
COOK-WAITE
Laboratories, Inc.
1450 BROADWAY, NEW YORK 18, N. Y.

Confidence . . .

in your dentures

The new denture patient has confidence in your dentures . . . and in your professional skill and integrity. That confidence *can* be strengthened by the prescription of Co-re-ga, which so effectively facilitates a quicker and more comfortable adjustment to proficiency with dentures.

CO-RE-GA IS NOT ADVERTISED TO THE PUBLIC

Co-re-ga

Accepted COUNCIL on DENTAL THERAPEUTICS AMERICAN DENTAL ASSOCIATION

Please send complimentary professional samples.

Dr. _____

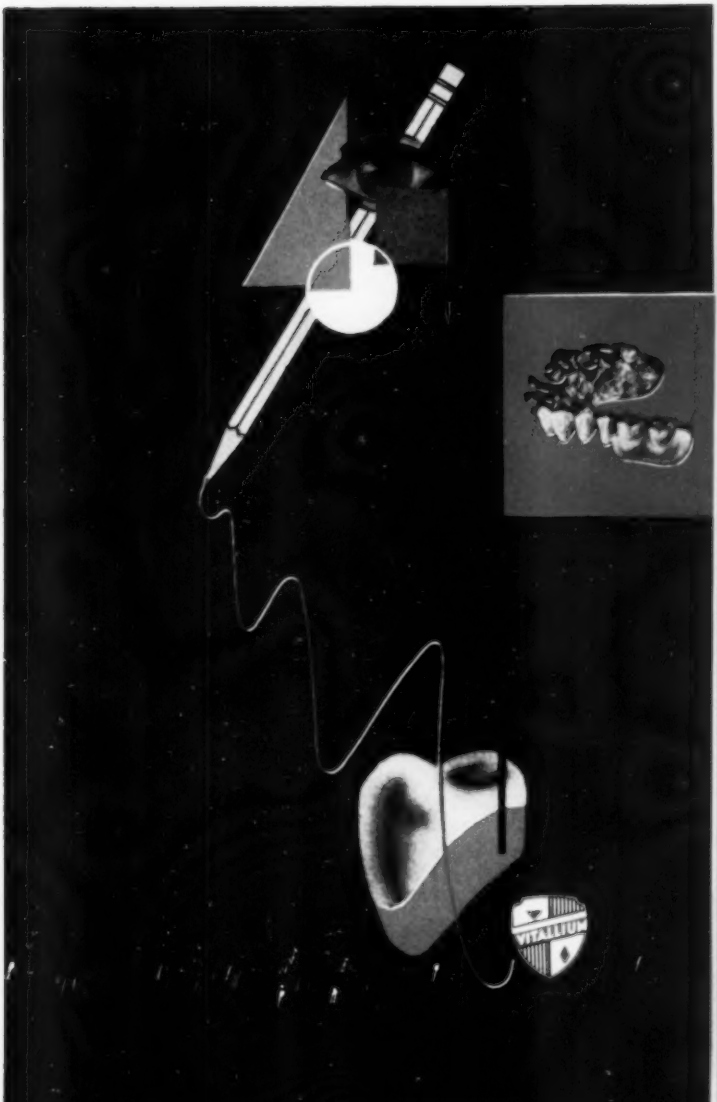
PLEASE PRINT

Address _____

City _____ Zone ____ State _____

23C

COREGA CHEMICAL CO. • 76 MILL ROAD • JERSEY CITY 2, N. J.


VITALIUM

Vitallium®

Quality Controlled for 20 Years

DESIGNING...

First LABORATORY STEP TO BETTER FUNCTION AND ESTHETICS

Careful survey of abutment teeth . . . plotting angles in proper relationship to tooth geometry . . . positioning clasp parts so that retention increases when forces tend to dislodge the appliance, yet without undue strain on abutments...these are some of the factors taken into consideration by the Vitallium technician when he designs cases to your prescription. His goal, always, is an appliance which enables the patient to masticate normally—which can be inserted without adjustment—is accurate in adaptation and is esthetically flattering—in short, a precision-made Vitallium appliance.

® By Austenal Laboratories, Inc.

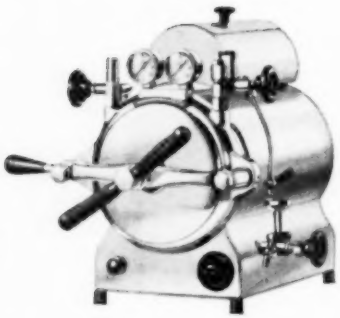
AUSTENAL LABORATORIES, INC.

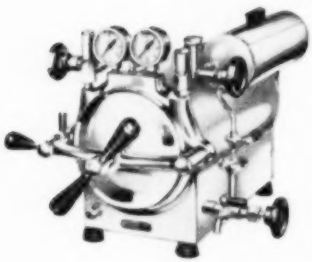
New York 16, N. Y. Chicago 21, Ill.

THERE IS AN OUTSTANDING VITALLIUM LABORATORY NEAR YOU

Now...
a new, big

PELTON HP-2





joins
the pioneering.

SPEEDY FL-2

for

FAST, EFFECTIVE AUTOCLAVING

Early in 1951, we introduced the revolutionary FL-2 Autoclave, which, for the first time, reduced minutes to seconds between consecutive sterilizing periods. Since then, orders have far exceeded our steadily increasing production of the FL-2.

Now, we are proud to present the big brother of the FL-2 . . . the new HP-2, with a sterilizing chamber 8 inches in diameter that takes instruments up to 16 inches long. Like the FL-2, the new HP-2 generates and then stores steam under pressure in its outer chamber ready for instant use. To the private office it brings large sterilizing capacity *plus* speed, hospital safety, economical operation, and professional distinction.

Ask your dealer today about Pelton HP-2.

PELTON

THE PELTON & CRANE CO., DETROIT 2, MICHIGAN

OPOTOW
JELSET
IMPRESSION POWDER

an elastic material which will provide an accurate reproduction of the impression area

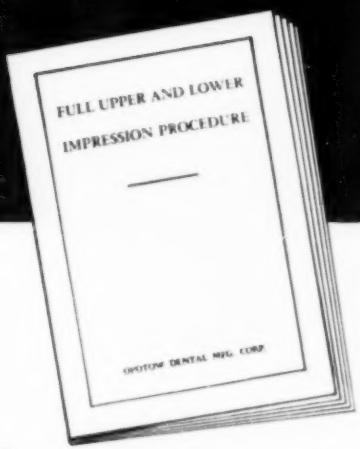
OPOTOW
MANDIBULAR and PERIPHERAL PASTE
(M & P)

with controlled flow– will not move until in contact with tissue

PRACTICAL, PROVEN FORMULAS . .

OPOTOW
IMPRESSION PASTE

the standard for full impressions, re-bases and washes



Please send for
"IMPRESSION PROCEDURE"

Interstate DENTAL CO., INC.

220 WEST 42 STREET • NEW YORK 36, N. Y.

Announcing

National Board Examinations

April 13-14, 1953
(Applications should be received by March 14, 1953)

December 7-8, 1953
(Applications should be received by Nov. 4, 1953)

States and Agencies that recognize National Board Certificate

ALABAMA	NEVADA
ARIZONA	NEW HAMPSHIRE
CONNECTICUT	NEW MEXICO
ILLINOIS	NORTH DAKOTA
INDIANA	OKLAHOMA
IOWA	OREGON
KANSAS	PENNSYLVANIA
KENTUCKY	RHODE ISLAND
LOUISIANA	SOUTH DAKOTA
MAINE	VERMONT
MARYLAND	VIRGINIA
MASSACHUSETTS	WASHINGTON
MICHIGAN	U. S. PUBLIC HEALTH
MINNESOTA	U. S. ARMY
MISSOURI	PUERTO RICO
NEBRASKA	

Circulars of information describing the National Board Examiners may be obtained

by writing: Council of the National Board of Dental Examiners
AMERICAN DENTAL ASSOCIATION
222 EAST SUPERIOR ST. :: CHICAGO 11, ILLINOIS

DuraBase

Simple, one-visit technique

Requires no cellophane

Takes only 20 minutes

Costs just 50c per denture

Be safe, be sure...

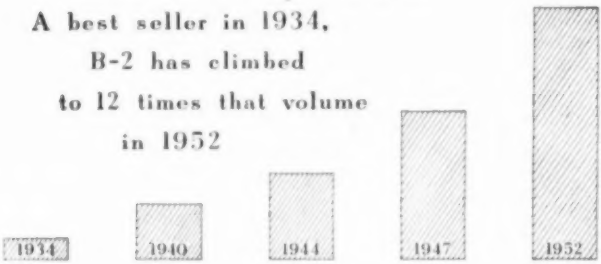
Demand time-tested and proven DuraBase. Order from your dealer. Positive results guaranteed.

only DuraBase can... do a DuraBase job..... *of permanent rebasing at the chair*

Reliance DENTAL MFG. CO. Chicago 5, Ill.

Dentistry's appreciation of quality is shown in its use of Ney-Oro B-2.

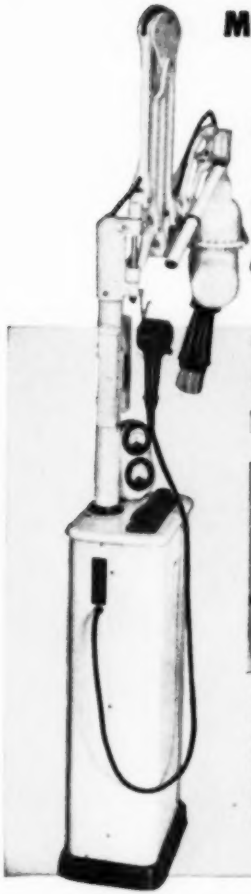
A best seller in 1934, B-2 has climbed to 12 times that volume in 1952



Ney-Oro A-1 for Inlays

Ney-Oro B-2 for Bridges

Ney-Oro G-3 for Partials



MORE ACCURATE DIAGNOSIS...
BETTER RADIOGRAPHS...

with a

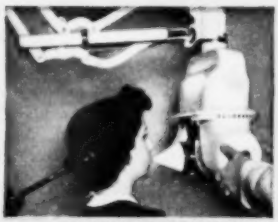
Ritter Dual-X

TWO MACHINES IN *ONE!*

YOUR CHOICE

... of VARIABLE TECHNIQUE

Set on variable, you have independent control of kilovoltage, the penetration of the rays, and milliamperage, the quantity of X-rays produced. Long distance techniques easily applied with the Dual-X set on variable.



... or STANDARD TECHNIQUE

Set on standard, kilovoltage and milliamperage cannot be adjusted. A reading of 10 milliamperes remains constant for all radiographs. You or your nurse can make routine examinations easily ... in a minimum of time.

Whether your next patient requires a routine interproximal examination, or an all-important intra-oral examination, with the Ritter Dual-X you are equipped to handle both Standard and Variable Techniques easily. On the advance design Ritter Dual-X you have independent control of kilovoltage and milliamperage. As a result, you obtain radiographs of greater diagnostic value ... radiographs with increased sharpness and a minimum of distortion.

Profile radiography for the recording of soft tissues or bone detail becomes routine due to the ease of Dual-X adjustment.

Enjoy the advantages of this modern X-ray, ask your Ritter dealer for a demonstration now.

Ritter
COMPANY INCORPORATED
BUILT UP TO A STANDARD NOT DOWN TO A PRICE

RITTER PARK, ROCHESTER 3, N.Y.

For anterior and posterior fillings and for the restoration of broken down molars and bicuspids, Doctors are getting excellent results with Diafil. The technic is extremely simple—the results are beautifully natural and enduring. Diafil is available in all natural tooth shades. Complies with A.D.A. Specification #9.

excellent!

DIAFIL

PFINGST & COMPANY, INC. • 62 COOPER SQUARE • NEW YORK 3, N. Y.

BUSCH BURS • MORICO DIAMOND ABRASIVES • AJUSTO HAND PIECES • STAINLESS INSTRUMENTS

Quick onset

...plus deep anesthesia

uneventful and rapid recovery!* (2 hours to normalcy)

*The results of a recent survey indicates that these are the qualifications dentists feel are "musts" for the anesthetic of their choice. These specifications are perfectly met with

Oradent CHEMICAL CO., INC.

ANESTHETICS

DIVISION OF:

MIZZY, INC., 304 E. 23rd ST., NEW YORK 10, N. Y.

Better Materials for Better Dentistry

10 Reasons FOR LEADERSHIP

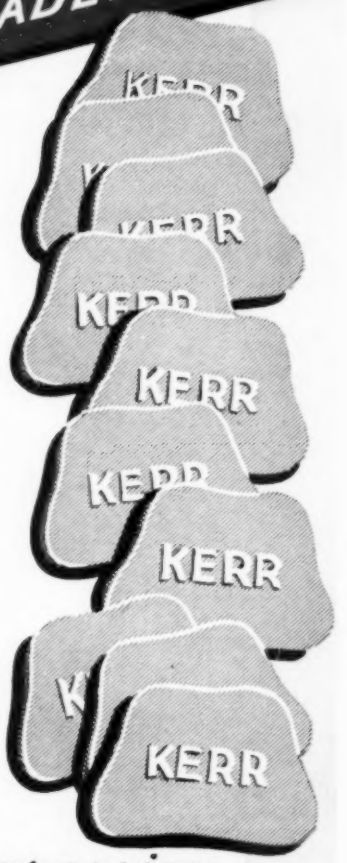
Ten qualities tell you why Kerr Compound continues to be the great world leader—

1. Softens easily and uniformly at moderate temperatures
2. Smooth to handle—works uniformly
3. Has excellent plasticity
4. High flow at impression temperatures
5. Ample working time
6. Hardens quickly when chilled, and without distortion
7. Surface responds readily to flaming
8. Trims beautifully
9. Minimum shrinkage gives maximum accuracy
10. Assures uniform, detailed impressions

See for yourself why generation after generation of dentists continue to acknowledge this great product as the world leader. Order a supply of Kerr Compound today.

Let us mail you our illustrated booklet on the Use of Impression Compounds. Write us.

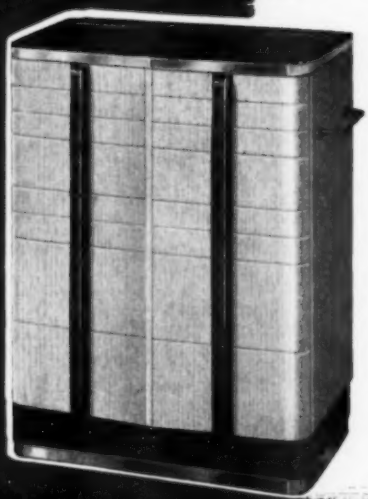
KERR MANUFACTURING CO.
DETROIT *Established 1891* MICHIGAN



KERR
Reg. U.S. Pat. Off.

Impression Compounds

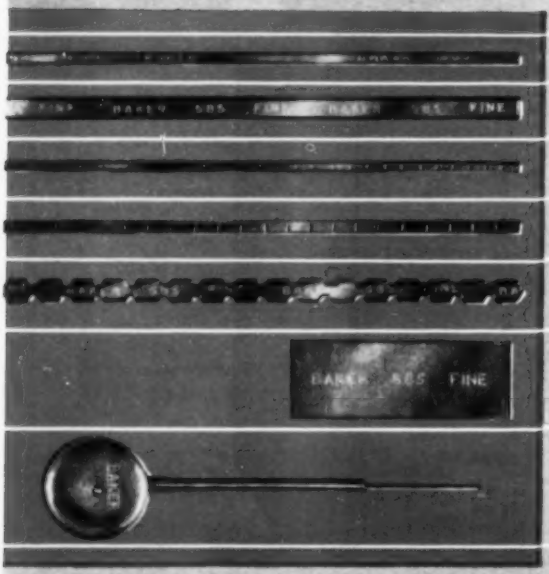
This investment
has never missed
a dividend



The American Cabinet Company

DIVISION OF HAMILTON [illegible] WISCONSIN

7 USEFUL FORMS OF BAKER SOLDERS



1. NARROW DWT. STRIP
2. WIDE 2 DWT. STRIP
3. SEGMENTED WIRE SOLDER 19 GAUGE
4. SEGMENTED BLOCK WELDING SOLDER
5. SEGMENTED STRIP
6. 1 DWT. PIECE
7. 5 DWT. SPOUT CONTAINER 23 GAUGE FOR PROSTHETICS — 28 GAUGE FOR ORTHODONTIA

Baker's vast background of precious metal research and our modern melting and manufacturing facilities assure absolute purity of metals. That's why Baker Solders are free of oxide inclusions—why they keep their color and full strength in mouth service.

ORDER BAKER SOLDERS BY GOLD CONTENT OR FINENESS.

GOLD COLOR SOLDERS: 450, 500, 550, 585, 600, 615, 650, 750, 800 FINE.

PLATINUM COLOR: 583, 615 WHITE, ESTHET 823 FINE.

PLATINUM SOLDERS for Ceramic Work: 1400°, 1500°, 1600°, 1700° Centigrade.

Be sure to specify form desired.

SEND FOR BOOKLET "The Art of Dental Soldering".

BAKER & CO., INC.

EAST NEWARK, N. J.	NEW YORK CITY	CHICAGO	SAN FRANCISCO
830 Passaic Avenue	30 Church Street	55 E. Washington	760 Market St.

BAKER

THE WORLD'S LARGEST WORKERS AND REFINERS OF PRECIOUS METALS

THE MOST serious hazard associated with dental operations is postsurgical bacteremia—which may lead to bacterial endocarditis, particularly in patients with congenital or rheumatic valvular disease of the heart.

AUREOMYCIN

HYDROCHLORIDE CRYSTALLINE

Lederle

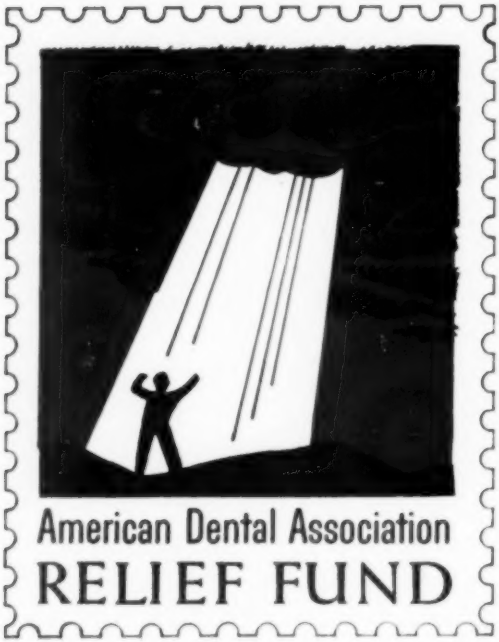
given orally in capsules has proved eminently successful as a prophylactic. In addition, this versatile antibiotic is supplied in forms specially designed for topical use in combating local infections in the oral cavity.

A booklet on the use of aureomycin for infections of the oral cavity is available on request.

CAPSULES (*250 mg.*)—*6 strips of 4 capsules in foil* (*Dental Package*).
DENTAL CONES (*5 mg.*)—*tubes of 12.*
DENTAL PASTE (*50 mg. per Gm.*)—*jars of 5 Gm.*
DENTAL OINTMENT 3% (*30 mg. per Gm.*)—*¼ oz. applicator tube.*

The above aureomycin products are available through your dental supply dealer.

LEDERLE LABORATORIES DIVISION *AMERICAN Cyanamid COMPANY*
30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.



GIVE NOW!

The Relief Fund is a charitable trust supported by voluntary contributions of dentists. It is perpetually dedicated to provide assistance to those unfortunate members of the dental profession who, through accident or illness, are totally unable to help themselves.

Mail your contribution today to

AMERICAN DENTAL ASSOCIATION RELIEF FUND
222 East Superior Street, Chicago 11, Illinois

THERE'S A Foredom MODEL for Every EXTRA-ENGINE REQUIREMENT!

MODEL 88

Allcord Engine. Also available in wall type (No. 98).

MODEL 21

Now no dentist need deprive himself of the advantages of an extra cord engine for away-from-the chair tasks. Precision-made arm. Reversible. 6-speed foot rheostat. A popular model with students.

LESS Handpiece **$42.50**

WITH Doriot Handpiece **$63.50**

MODEL 505

Cable engine only $21.00. Heavy duty models in overhead and table types also available.

HERE ARE A FEW REPRESENTATIVE MODELS

MODEL 7

ALLCORD ENGINE

WITH Doriot handpiece **$88.75**

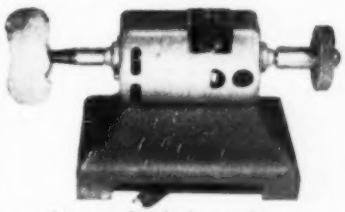
LESS handpiece **$67.75**

A HEAVY DUTY MODEL

built for many years of trouble-free service. Precision-made arm. Reversible. 6-speed foot rheostat.

Treat Yourself

to that auxiliary allcord engine you've always wanted at a price that's so easy on your budget.



JUNIOR DENTAL LATHES

4 SPEEDS

$18.75

At this startlingly low price, every dentist can afford one.

Order One Today From Your Dealer
If he cannot supply you, write us direct. Catalog D-5725, on request.

FOREDOM ELECTRIC CO.
27 Park Place, New York 7, N. Y.

The Crescent Wig-l-bug, the wonder electric mortar-and-pestle that has placed amalgam work on a scientific basis, is now available to you in a beautiful, stylized WHITE bakelite housing. This New, White Wig-l-bug has the same dependable, trouble-free mechanism that produces uniformly perfect mixes of alloy and mercury. But now it is dressed in gleaming white and fit company for the most up-to-date equipment and appointments. (The familiar black bakelite housing, however, is supplied to those who prefer it.)

Requires only 7 to 10 seconds to triturate enough amalgam for the average filling. Saves time, prevents waste, easy-to-use with your preferred alloy. Order thru your dealer. White Wig-l-bug only $60.50; black Wig-l-bug, $55.50.

Crescent DENTAL MANUFACTURING CO.
1839 South Pulaski Road, Chicago 23, Illinois

Request a supply of

NEW Sucaryl Recipes

for sugar-restricted dieters

WHEN your patients on sugar-restricted diets complain of tasteless, unappetizing meals, have them try these delicious new recipes. In this new 32-page booklet, they'll find recipes for cookies, cake, pie, candy, ice cream, pudding and other desserts . . . salad dressing, sauces, relishes and beverages . . . home-canned fruits and jams. All are sweetened with non-caloric SUCARYL, thus avoiding use of sugar and keeping calories at a minimum. SUCARYL can be cooked right in like sugar, leaves no bitter aftertaste in ordinary use. It is available as SUCARYL Sodium Tablets, in bottles of 100 and 1000; and SUCARYL Sweetening Solution, either sodium or calcium form, in 4-fluidounce bottles. The new recipe booklet is now available at pharmacies without charge, or you may obtain a supply for your patients by writing Abbott Laboratories, North Chicago, Illinois. Abbott

Sucaryl®
(CYCLAMATE, ABBOTT)

NON-CALORIC SWEETENER FOR SUGAR-RESTRICTED DIETS

1-52

Highest Esthetic Standards

FOR ALL

METAL RESTORATIONS

Steele's facings are designed *specifically*
as bridge teeth . . . No marked collar line,
and no wide interproximal spaces.
The character markings are designed to serve
a double purpose in that they act
as tiny light-reflecting facets when wet,
giving the tooth a truly lifelike sparkle.
The total result is perfect harmony
with adjacent natural teeth and surrounding tissue.

THE COLUMBUS DENTAL MANUFACTURING COMPANY • COLUMBUS 6, OHIO

Note: When possible Steele's Col Fac backings should be used with Steele's New Hue facings – to preserve the original shades and insure highest esthetic standards.

Steele's INTERCHANGEABLE Facings

IN NEW HUE SHADES

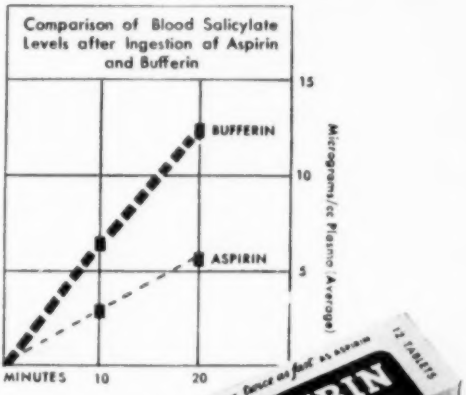
Doctor, I have a toothache!

When dental pain strikes, the patient thinks first of you. At midnight or 6 A.M., or in the midst of a busy day, your patient expects you to do something for her—immediately.

For *faster pain relief* recommend BUFFERIN, the antacid analgesic, which *acts twice as fast as aspirin*. Within 10 minutes after BUFFERIN is taken, the blood salicylate levels are higher than those attained by aspirin in twice this time.

BUFFERIN is antacid, too. Whether given in small or large doses, BUFFERIN rarely produces gastric distress.

Use BUFFERIN before and after extractions and along with other therapy to minimize discomfort.



BUFFERIN®

ACTS TWICE AS FAST AS ASPIRIN
DOES NOT UPSET THE STOMACH

BRISTOL-MYERS CO., 19 W. 50 St., New York 20, N.Y.

For Penicillin Therapy in Dental Practice

just 1 or 2 tablets three times daily

Pentids

Squibb 200,000 Unit Penicillin Tablets

For treatment of acute oral Vincent's disease as an adjunct to other appropriate dental procedures, and for prophylaxis against secondary infection before and after extraction and other dental surgery. When pre-existing cardiac lesions predispose to subacute bacterial endocarditis or there is extensive tissue trauma, parenteral penicillin should be given before or at time of extraction followed by Pentids therapy postoperatively.

Pentids—formulated for convenient t.i.d. dosage—contain the new 200,000 unit oral systemic penicillin dosage advocated by Keefer[1] and others.[2] Supplied in bottles of 12 and 100 scored, buffered tablets, each containing 200,000 units of crystalline penicillin G potassium. Pentids should be swallowed with water one-half hour before or at least two hours after meals.

1. Keefer, A., S., Postgrad. Med. 9:101, Feb. 1951
2. Flippin, H. F., and Israel, H. L., Med. Clin. North Amer. 34:1653, Nov. 1950

For a supply of Pentids prescriptions for your practice, ask your Squibb Representative or write to
E. R. Squibb & Sons
745 Fifth Ave., New York 22, N. Y.

SQUIBB A LEADER IN PENICILLIN RESEARCH AND MANUFACTURE

"PENTIDS" IS A TRADEMARK OF E. R. SQUIBB & SONS

Successful users
of KADON
recommend the
"brush on" technic

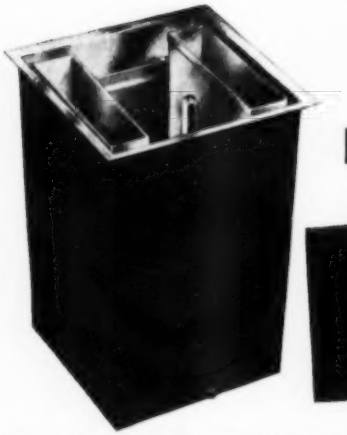
- *fast*
- *efficient*
- *certain*
- *satisfactory*

KADON'S chemistry works best when the powder and liquid are combined *inside the cavity*. As the powder particles are virtually "melted" by the liquid, the filling material flows into place in successive layers. Maximum adaptation, without voids, is secured; troublesome adjustment of mechanical matrix is eliminated; objectionable excess, difficult to remove, is avoided. In fact, every detail of the filling operation is far more efficient with the "Brush On" technic. And the end result—the KADON filling—has all the pleasing characteristics that resin research has made available to you in KADON.

***The* KADON APPLICATION KIT**
Flint glass dispensing tray
Six detachable brushes (3 medium
3 small; all can be sterilized)
Two aluminum handles with tapering
shanks slotted to fit brushes
$4.75

KADON

Reg. U.S. Pat. Off.



RINN

STAINLESS STEEL PROCESSING TANK

ONE GALLON

Complete with 2 removable tanks and light-tite cover

$69.50

INSERT TANKS
(may be used in most old rubber jackets)

$16.50 ea.

FAST, ACCURATE TEMPERATURE CONTROL

THERMAL CONDUCTIVITY EXTREMELY HIGH. Saves time waiting for proper processing temperatures. Removable standpipe for fast drainage.

EASY TO CLEAN AND MAINTAIN. Wrinkle-finish water jacket prevents "sweating".

EASILY INSTALLED. Two simple connections.

RINN X-RAY FILM. Standard. Full "gray scale" tone ranges disclose ALL conditions.

RINN SNAP-A-RAY. Speeds intra-oral x-ray. More parallel positioning.

RINN-O-METER. Accurate X-ray angulation **instantly.** Clearly marked, easily read.

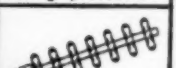
RINN FAMOUS EEZEE-MOUNTS. Triple layered, durable. Filling protection.

RINN No. 3 BITE-WINGS. Better processing and packaging entirely within metallic wrap.

RINN

X-RAY PRODUCTS Inc.

2929 N. Crawford Chicago 41, Ill.



RINN HANGERS. Minimum clip-to-film contact. Super-grip quickly released. All sizes. Chemical proof.

RINN-TIMER. Avoids retakes, wasted film. Short or long ring. Shaped to fit hand.

RINN SOLUTIONS. Long lasting. Strength will not fade suddenly.

RINN THERMOMETER. Floating. Direct heat conduction. Register scale curved.

RINN PROCESSING TANK. High thermal conductivity. Fast drain. Easy to clean.

now try

improved stabelyne

we guarantee you'll like it!

improved stabelyne offers unique advantages:

Now Premixed—the problem of air bubbles overcome—porosity eliminated—a dense, homogenous material that is easy to use. Has the texture of soft compound.

More Pleasant to Use—not messy or sticky—definitely more pleasant for the patient from *every* standpoint.

Crystal Clear—without any sign of granulation.

Permanent as a processed denture.

Adequate working time.

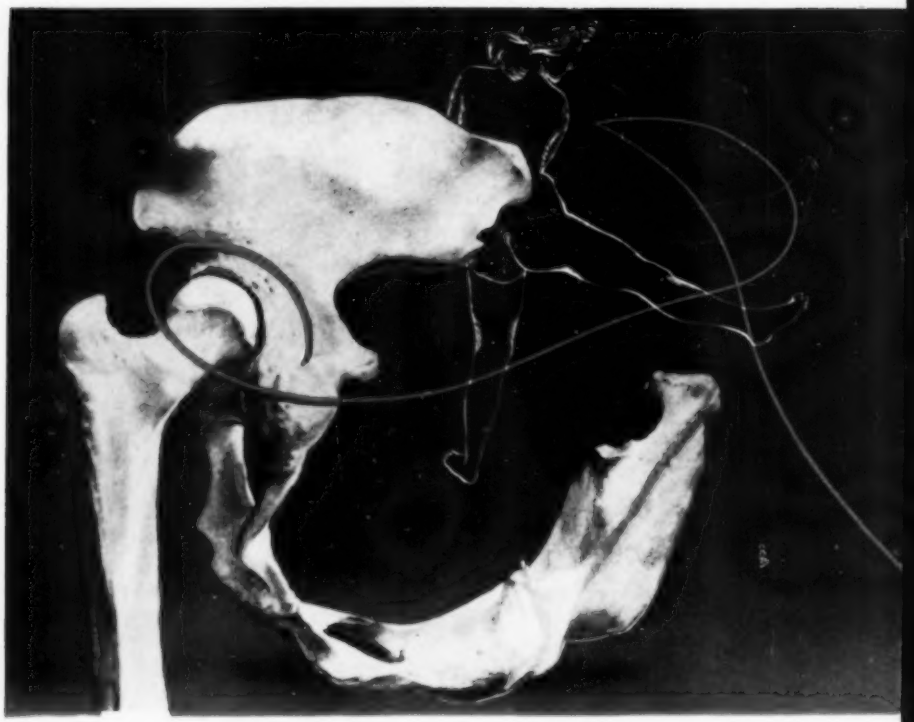
Don't take our word for it! Try *Improved* Stabelyne on our *guarantee* that you will be completely satisfied or your money will be refunded.

order from your dental dealer today

$1.50 a unit

dental perfection co.

543 W. Arden Ave., Glendale 3, Calif.



Man can move his limbs in more than one direction with ease, for they are connected with ball-and-socket action.

The mandibular joint acts like the hip-bone when tooth cusps are actually engaged, so that the mandible moves through an arc.

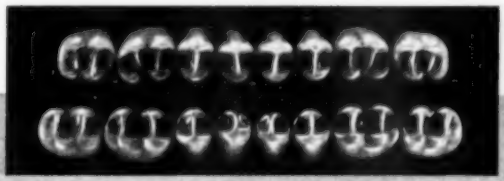
We have followed Nature's own pattern in our revolutionary posterior teeth. The new Justi-Form posteriors are carved with concave cuspal slopes that provide a "ball-and-socket action" compatible with the function of the joint.

Justi-Forms are easily set to allow a free glide to centric position without trauma — an essential to stability and comfort. The narrow occlusal table means less stress. And yet, we have preserved natural appearance.

S-R Teeth

One thing more, Doctor. We have been able to give you much greater cutting efficiency because of drastically sharper intercuspal ridges. And there is no need to fear fracture with the newly developed, tougher S-R plastic.

IT'S NATURE'S PATTERN -



JUSTI-FORM
TRADE MARK
POSTERIORS

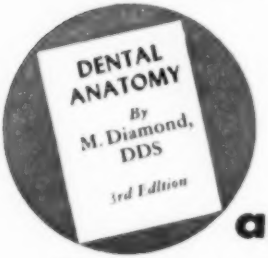
Justi-Forms combine the stability of the "mechanical" with the natural beauty of the "anatomical."

JUSTI

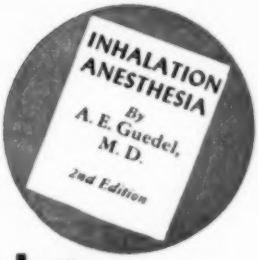
Products for Better Dentistry

H. D. JUSTI & SON, INC. • PHILA. 4, PA.

to the point —



DDS



and up to date . . .

Practicing dentists and students will find Moses Diamond's **DENTAL ANATOMY** a valuable reference and work-book. With 471 pages, 300 illustrations and diagrams, and a 65-page ATLAS OF THE ANATOMY OF THE HEAD AND NECK with many plates in full color, this is one of the most encompassing works of its nature. PRICE $15.00

Here's a fundamental guide to **INHALATION ANESTHESIA** written by a leading authority in this specialized field. Because of the simplicity of presentation and thoroughness of coverage, this book has become a most valued helpmate to all dentists administering inhalation anesthesia. PRICE $3.75

Order now at your bookstore or *The Macmillan Company* 60 Fifth Ave., New York 11, N.Y.

---

unless

your 1953 dues have been paid this is the LAST ISSUE of the Journal we can send you . . .

SO, if you haven't yet paid your 1953 dues, please do so immediately. Once off the mailing list it takes time to restore a name. Act quickly to avoid disappointment. Keep your Journal coming without interruption.

INDEX TO ADVERTISEMENTS

March 1953

Abbott Laboratories A-65
Acralite Co., Inc. A-30
American Cabinet Co., The A-59
American Dental Association A-11, A-33, A-42, A-52, A-62, A-74
American Sterilizer Co. A-19
Ash, Sons & Co., Inc., Claudius A-43
Astra Pharmaceutical Products, Inc. .A-4, A-5
Austenal Laboratories, Inc. A-48, A-49

Baker & Co., Inc. A-60
Bristol-Myers Co. A-67
Burton Manufacturing Co. A-6

Castle Co., Wilmot A-22
Caulk Co., L. D. A-7, A-69
Cetylite Industries, Inc. A-18
Childs Manufacturing Co. A-29
Church & Dwight Co., Inc. A-20
Classified Advertising A-40, A-41, A-42
Coe Laboratories, Inc. A-25
Columbia Dentoform Corp. A-10
Columbus Dental Mfg. Co., The A-66
Colwell Publishing Co. A-23
Cook-Waite Laboratories, Inc. A-46
Corega Chemical Co. A-47
Crescent Dental Mfg. Co. A-64

Dental Perfection Co. A-71
Dentists' Supply Co. of New York ..... 2nd Cover, 4th Cover
Dunhill of London, Inc., Alfred A-23
DuPont DeNemours & Co. (Inc.), E. I. ..A-8

Exakta Camera Co. A-6

Flossy Dental Co. A-6
Foredom Electric Co. A-63
FR Corporation, The A-28

Gesner, Inc., M. A. A-39

Handy & Harman A-1

International Nickel Co., Inc., The. A-9
Interstate Dental Co., Inc. A-51

Jelenko & Co., Inc., J. F. A-26
Johnson & Johnson A-44
Justi & Son, Inc., H. D. A-72, A-73

Kerr Manufacturing Co. A-58
King's Specialty Co. A-17

Lauer Metal Shop A-42
Lea & Febiger A-33
Lederle Laboratories A-61

Macmillan Company, The A-74
Medical Protective Co., The A-26
Merck & Co., Inc. A-36
Mizzy, Inc. A-57
Moyer Co., Inc., The J. Bird A-35

National Dairy Council A-37
Ney Co., The J. M. A-54
Novocol Chemical Mfg. Co., Inc. A-32

Oral B Co. A-24

Parke, Davis & Co. A-45
Pelton & Crane Co., The A-50
Pfingst & Co., Inc. A-56
Physicians Casualty & Health Association A-10
Professional Budget Plan A-13
Professional Printing Co., Inc. A-18
Pro-phy-lac-tic Brush Co. A-38
Pycopé, Inc. A-27

Ransom & Randolph Co., The A-12
Reliance Dental Mfg. Co. A-53
Remington Rand, Inc. A-36
Rinn X-Ray Products, Inc. A-70
Ritter Co., Inc. A-55
Rower Dental Mfg. Corp. A-18

Squibb & Sons, E. R. A-68

Ticonium A-16
Toledo Dental Products Co., The A-21

U. S. Defense Bonds A-34

Warren Laboratories A-6
Wernet Dental Mfg. Co., Inc. A-14, A-15
White Dental Mfg. Co., The S. S. ..A-2, A-3
Wiggin's Sons Co., H. B. A-26

THE TRUBYTE Bioform®

PROFESSIONAL DENTURE SERVICE UNIT

Provides the important elements needed to increase your success in full and partial denture work.

The Trubyte Bioform Shade Guide

The Trubyte Bioform Shade Selector

The Trubyte Bioform Set-Up Booklet

The Trubyte Tooth Indicator

The Trubyte Bioform Mould Guide

The Truflex Selector

THE TRUBYTE TOOTH INDICATOR – the accurate guide to tooth selection.

THE TRUBYTE BIOFORM MOULD GUIDE – enables you to verify your mould selection.

THE TRUFLEX SELECTOR – the flexible selection rim.

THE TRUBYTE BIOFORM SHADE GUIDE – to assist your preliminary shade selection.

THE TRUBYTE BIOFORM SHADE SELECTOR – verifies your shade selection in the mouth.

THE TRUBYTE BIOFORM SET-UP BOOKLET – representative set-ups of all upper moulds.

THE DENTISTS' SUPPLY COMPANY OF NEW YORK

220 WEST 42nd STREET, NEW YORK 36, N. Y.